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VETERINARY MEDICINE

FEBRUARY CONTENTS 1947

Veterinary Progress, Policies and Comment

Medical History Notes, 43; Karl Meyer Receives Award, 44; Funds for Medical Research, 44; Periodic Ophthalmia, 45; Penicillin-Like Antibiotics, 45; Duties of Veterinarians, 45; The Brucellosis Vaccination Question Simplified, 45; Doctor Jakeman Dies, 45; And Then Some—, 45; Vitamins in Calf Rations, 45; Legion of Merit to Doctor Wright and Colonel Nye, 46; Ribbon Citation for Colonel Egan, 46; Regular Army Officers Newly Appointed, 47; Veterinary Officers Separated from Service, 47; BCG to Be Employed in U. S. and Canada, 48; The Antivivisection Movement, 48; USDA Poultry Meat Inspection, 49; Egg Powder and Salmonella Infection, 49; Science Aids in Better Livestock, 50; Who Introduced Anesthesia? 51; Hog By-Product for Peptic Ulcer, 52; Foot-and-Mouth Disease in Mexico, 52; March of Science in 1946, 52; Rotolactor System Offered Dairymen, 53; Served Its Purpose, 53.

Fiftieth Annual Meeting U. S. Livestock Sanitary Association 54-71

Account of Organization, 54; Bovine Tuberculosis, Past, Present and Future, 55; No-Visible-Lesions in Bovine Tuberculosis, 55; Report of Committee on Tuberculosis, 56; Control of Johne's Disease, 56; Cattle Mange and Scabies, 57-59; Genesis of Bovine Mastitis, 59; Brucellosis Research, 60; Brucellosis and Livestock Production, 61; Brucellosis Control in Oregon, 62; Human Brucellosis, 62; Report of Brucellosis Control Committee, 63; Report of Committee on Miscellaneous Transmissible Diseases, 64; Report of Committee on Parasitic Diseases, 64; Solid Foundation for Veterinary Science, 65; Livestock Disease Prevention and Control in Canada, 65; Crystal Violet Vaccine, 66; Report of Committee on Transmissible Diseases of Swine, 67; Salmonellosis of Domestic Animals, 67; Antigenic Behavior of Salmonella Pullorum, 68; Control of Fowl Typhoid, 68; Present Status of Pneumoencephalitis, 69; Spread of Avian Pneumoencephalitis, 70; Avian Pneumoencephalitis, 70; Attitude of Poultry Industry to Avian Pneumoencephalitis, 70; Report of Committee on Miscellaneous Transmissible Diseases of Poultry, 71; Officials of U. S. L. S. A. for 1947, 71.

Streptomycin in Treatment of Pullorum in Baby Chicks .. 72

Effect of Penicillin on Erysipelothrix Rhusiopathiae 74

DDT in Canine Practice 76

Toxic Effects of DDT on a Cat 78

Clinical Reports 79-81

Cow, General Delivery, Woodenville, 79; Complicated Eclampsia, 81.

Abstracts 82

Luxation of the Patella in Large Animals, 82; Antimony Effect on Canine Heart, 82; Vitamin A Requirements in Calves, 82.

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Medical History Notes[1]

The history of medicine is second only to the history of religion in the centuries it spans.

It is customary to attribute the birth of medicine to a mythical personage called Aesculapius, the son of Apollo and Arsinoe, who was abandoned by his mother and suckled by a goat.

Hippocrates, the founder of rational medicine was born in 460 B.C. the son of a physician and a midwife. He established a medical method without incantation, charms and appeal to mystical powers which had been the basis of all former systems of medicine.

Galen, born about 130 A.D., was the son of an architect. The impress of his learning and genius was so great that, for more than a thousand years, to question his teaching was medical heresy.

Galen dominated medical thought through 13 centuries. The magnitude of that achievement is lessened by the fact that they were centuries in which thought was almost nonexistent.

Paracelsus, a contemporary of Paré, was the son of a Swiss physician. He reformed medicine as Paré reformed surgery. While a professor at Basle he affronted the faculty by lecturing in German instead of Latin and scandalized it by burning the works of Galen in his class room.

Ambrose Paré, universally revered as the father of surgery, was a barber and the son of a barber. He astounded the medical world more by describing his operations in his own language, instead of Latin, than by his skill in operations.

Andreas Vesalius, a Belgian (1514-1564), is regarded as the father of anatomy. By his dissections he overthrew the teachings of Galen. While professor of anatomy at Padua he narrowly escaped death, in the Inquisition, for impiety (dissecting a human cadaver).

William Harvey, who was born in 1578 must be regarded as the founder of scientific medicine. He is remembered for his discovery of the blood but, as the founder of the method of investigation instead of speculation and theorizing as a means of advancing science, he rendered medicine a greater service.

Harvey discovered the truth concerning the circulation of the blood in 1610 and taught it in 1616, but did not publish it until 1628. Even then his confréres assailed him for doubting Galen and his patients abandoned him as one somewhat mad.

Edward Jenner was born in 1749 and devoted his medical career to a study of the protection against smallpox afforded by cowpox. By 1770 he was compiling observations and 10 years later he communicated his discovery to physician friends, but he did not publish his results till 1798. Since both Harvey and Jenner waited 18 years after making their discoveries before announcing them, they cannot be charged with—"rushing into print."

[1] Stengel, Alfred, Currents and counter currents in the progress of medicine. *Transactions of the College of Physicians*, 7:1, pp. 64-88. 1939.

Karl Meyer Receives Award

The Sedgwick Memorial Medal for 1946 was awarded to Karl F. Meyer, Director of the Hooper Foundation for Medical Research and member of the Faculty of the University of California Medical School, at the 74th annual meeting of the U. S. Public Health Association Nov. 11-15, 1946, at Cleveland, O.

The award was made to Doctor Meyer in recognition of his "brilliant part in revealing the secrets of diseases transmitted by animals to man" and of his "vigorous and enlightened service in building up the public health program of the West Coast and of the nation."

Doctor Meyer is the first veterinarian to receive the Sedgwick Memorial Medal, but of the 15 other recipients two, Theobald Smith

Karl F. Meyer

and Hans Zinsser were noted chiefly for researches in the field of animal diseases and this work was an important factor in the reputations of three of the other recipients of the medal—McCoy, Park and Rosenau.

Doctor Meyer was born in Basle, Switzerland, in 1884 and was graduated from the School of Veterinary Medicine of the University of Zurich in 1909. 1910 to 1913 he taught pathology and bacteriology at the School of Veterinary Medicine, University of Pennsylvania; 1913-1914 he was head of the laboratories of the Pennsylvania Livestock Sanitary Board. In 1914 he went to the University of California as Professor of Bacteriology and Protozoölogy. In 1915 he became a member of the staff of the Hooper Foundation for Medical Research. In 1924 he received the degree of Dr. Phil. (Ph.D.) from the University of Zurich and later the honorary degree of M.D. from the same institution. Since 1924 he has been Director of the Hooper Foundation and has served on the faculty of the University of California Medical School.

Quoting the American Journal of Public Health:

"Dr. Meyer's investigations have ranged over a wide field, including comparative pathology and bacteriology, protozoölogy, intestinal infection, immunology, and brucellosis. In recent years he has made contributions along four major lines. His studies of the botulism bacillus and other anaerobes and his other contributions to food technology have had far-reaching influences. His researches on the bacteriology and epidemiology of sylvatic plague have made him one of the world's foremost authorities on this subject. He was the first fully to realize and to emphasize the importance of psittacosis, and not only love-birds but even pigeons throughout the country have cause to dread his name. Most dramatic of all perhaps, was his pioneer discovery of the virus of Western equine encephalomyelitis, from which sprung the recognition of the danger of this disease to man."

Through the years Doctor Meyer has been a frequent contributor to the programs of veterinary meetings. He has held important lectureships at Harvard and John Hopkins universities.

Doctor Meyer figured indirectly in another award at about the same time, when James Graham Chesnutt received the 1946 American Association for the Advancement of Science-George Westinghouse Science Writing Award and a prize of $1000 at the Boston meeting of the A.A.A.S. December 27th. Mr. Chesnutt received the award for a story entitled, "Bubonic Plague Preventive Proven in Animal Tests Here." The article describes work done by Doctor Meyer in the development of a vaccine to be used against bubonic plague—the "Black Death" of the ancients.

* * * *

The duty of imparting culture—science is a part of culture—definitely belongs to education, educational institutions and teachers. . . . It is the teachers obligation to impart to the student higher ideals than merely to be able to get a paying job after he has been ground through the mill, necessary as a paying job may be.—*A.A.A.S. Bul.*

* * * *

Funds for Medical Research

A total of 264 research projects in 77 universities, hospitals and other public and private institutions in 26 states is already under way supported by $3,900,000 allotted by the Surgeon General of the United States Public Health Service under the authority of Public Law 41D, which appropriates funds for research "relating to the causes, diagnosis, treatment, control and prevention of physical and mental diseases and impairments of man." Applications for grants from these funds for research are being received by Research Grants Division of the National Institute of Health at the rate of 800 a year.

Periodic Ophthalmia

Many observing veterinarians never took the infectious theory of periodic ophthalmia seriously, but regarded the ailment a systemic disease, the nature of which they did not profess to understand in the light of contemporary knowledge. They nevertheless saw more than a local disorder in the anhidrosis, panting, unshed coat, and the poor hot weather risk of the old blind horse.

Penicillin-Like Antibiotics

Litmocydin, an antibiotic of a new type has been isolated from a sample of Russian soil. It is a litmus pigment which inhibits strongly the growth of staphylococci, streptococci, tubercle bacilli and *Vibrio comma*, reports Gause of the Institute of Tropical Medicine, Moscow, in the *Journal of Bacteriology*. He also announces in *Science*, the discovery of another antibiotic colistatin which is bacteriostatic for pneumococci, staphylococci and others.

Duties of Veterinarians

The public knows little of the wide scope of veterinary science? That is because this essential profession, comparatively small in number, always has functioned without fanfare. It would be better for both the profession and the public if the latter realized that veterinarians' duties include: (1) animal disease control, (2) alleviation of the suffering of beasts, (3) inspection of foods, (4) protection of the public health and (5) unceasing vigilance against foreign plagues that might easily and quickly bring ruin to America's multi-billion dollar livestock and poultry industry.—*Vitamineral Products Company.*

The Brucellosis Vaccination Question Simplified

A lot of time is wasted in discussing whether the calves in a brucellosis-free herd should be vaccinated with strain 19. A prominent veterinarian has aptly said: "There are just three kinds of herds, those that have had brucellosis, those that have brucellosis and those that are going to have brucellosis."

Hence the discussion as to whether to vaccinate a noninfected herd is really a discussion as to whether the calves should be vaccinated to prevent loss or should be vaccinated after the loss begins to eventually stop it. It will save time if the speakers will simply declare themselves as *for* or *against* preventive medicine. Then auditors will know their views on this subject without vapid verbiage.

Doctor Jakeman Dies

Dr. Harry W. Jakeman, president of the A.V.M.A., 1941-42, died at his home in Boston, December 23, 1946. He had been in ill health for several years.

Doctor Jakeman was born in Halifax, Nova Scotia, in 1885 and was graduated from the School of Veterinary Medicine, University of Pennsylvania in 1909, and spent a year in graduate study in Germany. He practiced in British Columbia five years, was five years on the staff of the University of Nevada, five years with the Pitman-Moore Biological Laboratories at Zionsville, Ind., and 21 years as manager of the New England Branch of the Pitman-Moore Co.

Harry W. Jakeman

Doctor Jakeman was active in veterinary organizational affairs; having been secretary of the British Columbia Veterinary Medical Association; secretary-treasurer of the Massachusetts Veterinary Medical Association; secretary-treasurer of the New England Veterinary Medical Association and eight years a member of the Executive Board of the A.V.M.A. including five years on the Board of Governors. He is survived by his widow, a son and a daughter.

And Then Some—

According to the Chief of the federal B.A.I. there are 60 million cows and heifers in the United States and 75% of them have not been tested for brucellosis. Of 10 million calves 25% have not been vaccinated.

Vitamins in Calf Rations

A calf is deficient in vitamin A at birth, according to the Idaho Experiment Station. However, it receives adequate amounts of this vitamin in its mother's colostrum provided the mother has been fed good quality green alfalfa or other legume hay during the latter weeks of pregnancy.

Most calves fed colostrum from well-nourished dams have recovered from their vitamin A deficiency by the time they are one or two days old. If the vitamin A deficiency persists, the calf is likely to develop scours.—*The Furrow.*

Legion of Merit to Dr. Wright

Dr. Willard H. Wright, chief of the zoology laboratory of the National Institute of Health, has been awarded the Legion of Merit by the War Department for "exceptionally meritorious conduct in the performance of outstanding service in the Southwest Pacific area and in Japan."

WILLARD H. WRIGHT
D. V. M., M. S., Ph. D.

Dr. Wright was cited for his services in leading a field party into the zone of military operations in Mindanao, where he discovered two new regions in which the infection schistosomiasis is prevalent. The citation says his research contributed greatly to the advance of medical science in the field of tropical medicine.

Legion of Merit Award

Colonel Elwood L. Nye, Veterinary Corps, was awarded the Legion of Merit for services set forth in the following citation:

"He served in the position of Director of the Department of Veterinary Field Service, Medical Field Service School at Carlisle Barracks, Carlisle, Pa., from December 19, 1942, to July 21, 1945. Colonel Nye assumed directorship of the Department of the Medical Field Service School at a time when both the need for and shortage of veterinary officers trained for field duties were critical. He rendered valuable service to the Government by the speed and quality of Instruction he planned and directed. His executive ability and knowledge of field duties were such as to make it possible for the School to give the veterinary officers a course of high standard and of great value to the men commissioned from civilian life."

* * * *

"Ribbon" Citation

For exceptionally meritorious conduct in the performance of outstanding service as Service Command Veterinarian, Seventh Service Command, Army Service Forces, Omaha, Nebraska, from 30 December 1945 to 10 June 1946, Colonel Harold E. Egan, Veterinary Corps, Army of the United States, is authorized to wear the Army Commendation Ribbon by direction of the Secretary of War.

—Authenticated News Photo

VETERINARY PRACTICE IN NORTH AFRICA

American soldiers participating in the North African invasion were astonished at the medical technic of the strange peoples they encountered. Coupled with entire absence of professional reticence, weird practices in the public squares of villages illustrated the methods of medicos, dentists and veterinarians. The illustration shows a native veterinarian "firing" a mare in the market place in the holy city of Kairouan, Tunisia. That such exhibitions are commonplace is indicated by the indifference with which others in the market place regard it.

Regular Army Veterinary Officers Newly Appointed

The appointment of the following officers to the Veterinary Corps of the Regular Army has been announced by the War Department:

Capt. William L. Abbott, Downers Grove, Ill.
Capt. George D. Bacheldor, Columbia, Miss.
Capt. Vincil C. Bishop, Memphis, Tenn.
Capt. Burt W. English, Hutchinson, Kan.
Capt. Robert L. Kerns, Milwaukee, Wis.
Capt. Glover W. Laird, Peoria, Ill.
Capt. Mulford C. Lockwood, Williamston, Mich.
Capt. Charles T. Luker, Dublin, Texas
Capt. Alex. J. Ryncarz, Tacoma, Wash.
Capt. Robert B. Weber, Dedham, Mich.
Capt. Thomas J. Wheelin, Preston, Idaho.
Lieut. Samuel G. Forester, Sumter, S. C.
Lieut. Lloyd J. Neurauter, Eaton, Colo.

Veterinary Corps Officers Separated from the Service Since VE-Day

(Supplement to lists previously published)

Alabama

Hales, Marion L. — McCrory, John A.
Justo, Joseph C. — Nall, John Delma

Arizona

Crump, John A. — Prchal, Charles J.

Arkansas

Fahr, Robert E. — Kelley, Virgil R.

California

Brown, James M. — Mynatt, Vernon S.
Hoop, Jay Dee — Taylor, Ernest S.
Jobe, Darr — Walker, John D.
Wion, John E.

Colorado

Carroll, Walter D. — Molello, Joseph A.
Epling, Glenwood P. — Pike, Tommy Lee
Hoerlein, Benj. F. — Reid, Donald G.
Klaich, Nick — Smith, Earl D.
Koenig, Richard E. — Utterback, John A., Jr.
Leadbetter, Lynn F. — Woods, Richard S.
Miller, Samuel G. — Zancanella, August T.

Connecticut

Arnold, Maurice W. — Leonard, Harmon C.
Beere, Merritt H. — Vail, John I.
Whitney, George D.

Florida

Reed, Ernest L., Jr. — Thomas, Jay Neff

Georgia

Clower, Thomas A. — Hart, Joel T.
Harris, James R. — Sikes, James H.

Illinois

Caldwell, Frank H. — Rinehart, James O.
Derrer, Lee W. — Saunders, Edward C.
Guilfoil, Thomas J. — Van Houweling, C. D.
Velflick, Irving H.

Indiana

Drudge, Junior H. — Waterfall, Clark

Iowa

Barrington, James A. — Kopp, Wendell J.
Becker, Leo F. — Nuckolls, Melvin N.
Finch, Robert W. — VandeGarde, Gerald C.
Gitz, George H. — Wahl, Robert C.
Wallinga, Merrill H.

Kansas

Berg, Leo G. — Meredith, William H.
Gump, Robert H. — Miesse, William B.
Harris, Warren G. — Mitchell, Kenneth P.
Hineman, Kalo A. — Pyles, Robert L.
Hoins, John Henry — Reeve, Marshall P.
Holler, Orvin H. — Ripple, William E.
Jackson, S. Lester — Rockhold, Merrill D.
McClurkin, Arlan W. — Sheehey, Max S.
Westerfeldt, Marvin H.

Louisiana

Upchurch, John W. — Wiswell, Wilbur H.

Maryland

Custer, Franklin D.

Massachusetts

McDonald, Edward J. P.

Michigan

Engel, Victor F. — Shull, Albert J.
Kosht, Duane L. — Vander Wall, Edwin R.
Larson, Roy G. — Webster, Harris D.

Minnesota

Hoyt, Robert H. — Morrow, Alan

Missouri

Bailey, Earl Glenn J. — Crutcher, Marvin L., Jr.
Olney, Richard

Nebraska

Brandt, Vincent J. — Preston, Kenneth S.
Peterson, Irvin E. — Wiggins, Harlan R.

New Hampshire

Brungot, Norman S.

New Jersey

Brown, John William — Gemberling, Arthur R.
Fruit, David J. — Scoville, Sheldon H.
Steinbach, Karl F.

New York

Arnaboldi, Allan C. — Jones, Wallace G.
Arnaboldi, Joseph P. — Malmberg, Rex A.
Boardman, Done A., Jr. — Michaels, Victor W.
Borer, Maurice H. — Palmer, Hallsey R.
Elmer, Everett K. — Parmelee, R. H., Jr.
Fish, Richard B. — Regenbogen, Milton
Goldberg, Abie — Tweddle, John R.
Haner, Frank H., Jr. — Ulrich, Carlton L.

North Carolina

Bass, Ernest H. — Brown, James E.
Blumberg, Victor H. — Hicks, Warren H.

Ohio

Carlin, Louis — Glass, Howard R.
Earhart, Robert N. — Paden, C. Edward
Wiley, Joseph A.

Oklahoma

McGee, George M.

Oregon

Bean, Robert L.

Pennsylvania

Bond, William P. — Rachlin, Herbert S.
Hettig, Edwin S. — Weber, Robt. Benj.
McGrath, John Thos. — Werrin, Nathaniel

South Carolina

Downing, Theodore O. — Jones, Preston B.

Texas

Ballard, David C. — Jones, Francis P.
Espensen, Lawrence L. — Milentz, A. R., Jr.
Gray, Jack, Jr. — Miller, Rufus H., Jr.
James, Philip M., Jr. — Munson, Alex. H.
Jameson, Henry E. — Phillips, Hugh M.
Johnson, S. N., Jr. — Young, James B.

Virginia

Grim, Courtney K. — Kamine, Abe B.
Howard, Jack H., Jr. — O'Keefe, Francis A.

Washington

Burke, Henry A. — Hastings, George H.
Ewing, William J. — Sheehan, John

Wisconsin

Anderson, Eugene E. — Culham, Merrill E.
Baker, Frederick W. — McLeod, Kenneth L.
Brekke, Alfred E. — Myhers, Palmer S.
Schiller, Alfred G.

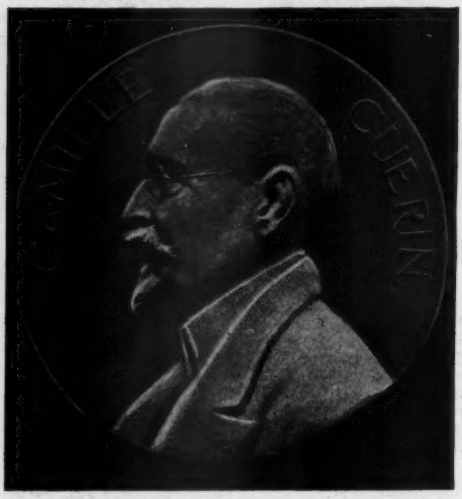
Puerto Rico

Cardona, Carlos Juan

BCG Will Be Employed in U. S. and Canada

An extensive trial of BCG will be conducted this year under the auspices of the U. S. Public Health Service when 100,000 or more persons will be vaccinated for the prevention of tuberculosis in various parts of the country.

Canadian public health officials, having carried on limited tests of BCG vaccination (hospital nurses and interns) for several years, will



This is a reproduction of a bronze plaque presented Camille Guerin, January 16, 1936, in recognition of his outstanding contributions in public health in the domain of disease prevention in animals. M. Guerin went direct from graduation at Alfort in 1896 to the Pasteur Institute and was associated with Calmette from that day until the latter's death

this year embark on far more extensive use of this product.

BCG (bacillus Calmette Guerin), as readers know, is an avirulent strain of the tuberculosis bacillus developed at the Pasteur Laboratories about 20 years ago. The vaccine was named for Director Calmette and veterinarian Guerin who was chiefly concerned in producing it. It has been used with marked success throughout continental Europe ever since its discovery, by both physicians and veterinarians.

A disaster following the use of a contaminated vaccine on babies at Luebeck, Germany, had much to do with the skepticism as to its value on this side of the Atlantic. A trial of a contaminated vaccine on calves at Ottawa, Ontario, "queered" its use on cattle in the United States until the bovine eradication program was so well under way that there was no point in experimenting with it.

The vaccine protects by premunition rather than by immunization, *i.e.*, by setting up a chronic subclinical or harmless infection that, so long as it exists, protects the body from infection with a virulent strain of *M. tuberculosis*.

A Veterinarian Looks at the Anti-vivisection Movement

"It is no conjecture, no assumption, but a statement based upon concrete facts, to say that if it had not been for the timely intervention of veterinary science in America, all the animal plagues of Europe would have become so deeply rooted in our livestock as to make attempts at eradication futile and efficient control questionable."

The above statement, written by a veterinarian, probably would not be contested by any worker in the veterinary sciences nor by any intelligent livestock producer. Let no one be so naive as to suppose that the control of animal plagues has not meant sacrifice in animals for research and prevention. Hundreds of animals have died that hundreds of thousands may live without suffering from certain maladies. The greater cruelty is to permit unnecessary suffering from preventable disease.

Before any disease can be controlled scientific knowledge of that disease has to be accumulated. What causes the disease? How does it spread? How might it best be controlled? To gain knowledge about life processes we must work with life. Sir Leonard Rogers said: "The whole of our knowledge of the causative organisms of scores of diseases of man and animals, and all of the curative and preventive sera and vaccines is the result of animal experiments."

There is a group in this country that would interfere with research in the medical sciences. They are the antivivisectionists. Most of them do not object to the use of animals for meat and furs but they do object to the use of animals to advance the cause of medicine. They would have you believe that all men engaged in research in the biological sciences are sadists and that no advance in medicine was ever made through research on animals. They perpetually propose legislation interfering with the use of animals in research, legislation that would severely handicap efforts to minimize suffering in animals they profess to protect.

There has been a great deal of confusion between antivivisection and anticruelty. No normal individual can condone wanton cruelty. By the same token no normal individual can honestly classify the use of cattle for food, for insulin, or for smallpox vaccine as wanton cruelty. It is not cruel to use 100 dogs on a scientific distemper project to protect many times 100 dogs. It *is* cruel to prevent such scientific research.—*N. R. Brewer.*

The incubation period of pigeon eggs is 17 days. The marketable ages of squabs varies from 25 to 30 days depending upon the breed. Pigeons mate for life and a pair of squab pigeons will produce from 10 to 14 squabs per year, weighing from 12 to 24 ounces apiece. A pair can raise only two good squabs at one time. The hen commonly begins laying again when the squabs are about three weeks of age, leaving the feeding of the young to the male.

USDA Poultry Meat Inspection*

The inspection of poultry carcasses at evisceration by the USDA Poultry Inspection Service is carried on under the Food Products Inspection Act of the Congress which authorizes inspection of perishable farm products. The inspection organization is self supporting; *i.e.*, it operates under cooperative agreements with the various state departments of agriculture and the cost of the service—salaries of inspectors and supervisory costs—are borne by the plants receiving the inspection.

The inspection is in no sense mandatory. It is available to any plant that wants it and is willing to comply with the sanitary requirements and the regulations for the conduct of the inspection. It is proving popular with the poultry processors for the number of plants having inspection is increasing steadily. In 10 years the amount of poultry meat inspected annually has increased from 26 million to 206 million pounds.

There is no federal restriction on the interstate shipment of poultry meat such as applies to beef, pork and mutton, but various cities require that poultry meat brought in to them for sale must be inspected. More municipalities are contemplating the enactment of ordinances of this sort for the protection of their citizens.

The inspection includes a post-mortem examination of each carcass, the maintenance of proper sanitary conditions to prevent the contamination of the edible parts, and supervision of labeling and packaging. Anything that may cause the bird to be unfit for human consumption is a cause for condemnation. Avian (or should we call it porcine, since the poultry people claim that swine constitute the natural host of the *Microbacterium avium* and chickens acquire it from the hogs on the premises) tuberculosis is responsible for 60% of the condemnations. All inspectors are veterinary graduates.

*Adapted from an interview of Dr. H. A. Weckler, Assistant National Supervision, USDA Poultry Inspection Service, by Hal Totten, announcer, Radio Station WGN, Chicago, Nov. 16, 1946.

Egg Powder and Salmonella Infections

Duck eggs have been definitely implicated as a cause of food poisoning in man, but the egg of the hen has a much cleaner record. However, strains of Salmonella of the food-poison types may be associated with hen's eggs. The increased use of egg powder makes the subject one of great importance. During the war there were outbreaks of food poisoning associated with the use of dried egg powder.

Ducks are susceptible to infection by strains of Salmonella which are pathogenic for man and the yolks of eggs laid by infected ducks contain the organisms. So far no hen eggs have been found to contain Salmonella pathogenic for man, but since such organisms have been found in the intestinal tract of hens the probability of both infection and contamination of hen eggs remains.

Ducks are susceptible to strains of Salmonella pathogenic to man. Eggs laid by infected ducks contain the organism

Further, since there is not a regular demand for duck eggs on most markets, accumulations of such eggs are commonly disposed of by incorporating them in egg powder made principally of hen eggs. The matter is worthy of the attention of food inspectors and health departments.—*Brit.-Med. J.*

Science Helps Produce Better, Healthier Livestock

Results of livestock research, together with official tests, inspections, and quarantines for the control of animal diseases, are helping farmers of the United States produce superior and more productive types of domestic animals. The 1946 annual report of Dr. B. T. Simms, chief of the Bureau of Animal Industry, describes progress made along these lines last year. The results deal with more than a hundred research projects and regulatory activities. Much of the work was in cooperation with other federal and state agencies under the general supervision of the USDA's Agricultural Research Administration.

Infectious Diseases

In veterinary research, the Bureau's investigators obtained new evidence of the persistence of infectious equine anemia. A horse that had been infected with anemia in 1935 apparently recovered was found still to carry the virus of the disease in its blood 11 years later, in 1946.

In the control of mastitis, penicillin proved to be a valuable addition to the drugs already used for this purpose. The research shows also that penicillin is easy to administer, has low irritating properties, and gives a comparatively high percentage of cures.

In the federal-state campaign against bovine tuberculosis, the percentage of reactors to the tuberculin test continued to be low—slightly less than 0.25%. Much of the eradication work involved the retesting of herds in which some infection had previously been found. Though hampered somewhat by shortages of veterinarians and farm labor, the campaign to eradicate bovine brucellosis was marked by a great increase in calf vaccination. The number of calves vaccinated in the official brucellosis control project being 694,139.

Danish Landacre were used in the hog improvement project

Parasite Research

Numerous advances occurred in methods of suppressing injurious parasites of livestock. As one discovery, the Bureau's investigators found that a preparation containing benzine hexachloride was valuable in controlling spinose ear ticks in cattle. Besides killing the ticks in the ears rapidly, the new remedy gave considerable protection against reinfection. Other preparations of the same drug proved to be effective also in destroying cattle lice and sheep ticks.

Results of the year's work likewise provided further evidence that feeding skim milk or whey to pigs helps keep them free of intestinal parasites, and that sodium fluoride removes swine roundworms very effectively.

Regulatory Functions

As in previous years Bureau inspectors supervised the interstate transportation of livestock, directed disease-control work at public stockyards, administered regulations to assure pure and potent veterinary biological products, and performed much other related work.

Results of Breeding and Feeding Research

In a study of variations in feedlot gains by beef calves, the investigators found that over three-fourths of the observed differences were due to heredity. Tests of limited grain rations for beef production showed that beef of acceptable quality can be produced by feeding a smaller quantity than usual of concentrated feed provided a full feed of good-quality roughage is supplied. In grazing studies with sheep at Beltsville, Md., soybeans proved to be very dependable as a temporary pasture during periods when permanent blue-grass pasture was scarce. Mixtures of barley and winter oats rated second for the same purpose.

In a project to develop improved types of swine good progress was made in producing strains that are superior to ordinary hogs in body conformation, fertility, rate of gain, efficiency in use of feed, and yields of desirable carcass cuts. Six different breeds including the Danish Landacre, are being used in this study, which is still in progress. An investigation of the endurance of horses indicated that rather simple tests may be useful in the selection of breeding animals. The tests are based on pulse and respiration rates after a definite amount of work.

A superior meat-type chicken is being evolved, Bureau scientists report, through selective breeding. The stock used for this purpose inclues the Single-Comb Rhode Island Red, Light Sussex, and White Wyandotte varieties.

Who Introduced Anesthesia?

1946 marked the centennial of the first use of inhalation anesthesia. The many discussions of the subject which have appeared in the medical press emphasized that, after 100 years, there is no consensus as to whom the credit is due for this one of the greatest boons to humanity. The record seems about thus:

1. William E. Clarke, a young physician of Rochester, N. Y., in January, 1842, administered ether on a towel to a patient while a tooth was extracted painlessly. He did not follow up his discovery and certainly did not introduce it to the medical profession.

2. Crawford W. Long, a physician of Jefferson, Ga., administered ether, also on a towel, to a patient while he painlessly removed a tumor from the patient's neck. The doctor employed anesthesia successfully four or five times within the next several years but made no report of his discovery until after Morton's claims of discovery had received wide publication.

3. Horace Wells, a dentist of Hartford, Conn., had one of his own teeth extracted, December 11, 1844, under nitrous oxide anesthesia. Toward the end of January, 1845, Wells, having used nitrous oxide in 15 additional cases was asked to demonstrate his discovery at the Harvard Medical School. The demonstration was a tooth extraction in a boy. The boy groaned during the operation and the highly skeptical audience, which included most of the leading doctors of Boston, laughed Wells out of countenance and considered the matter a hoax, notwithstanding the boy stated afterward that he felt no pain. Wells returned to Hartford and continued to employ anesthesia in extractions; but anesthesia had not "sold" to the medical profession.

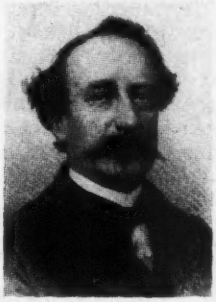
4. W. T. P. Morton was present at the Hartford demonstration and had discussed the matter with Wells previously. After several months he applied to C. F. Jackson, a well known chemist, for some nitrous oxide. Jackson replied that he had none and offered ether, telling Morton it would do just as well. That same evening Morton used ether in the extraction of a tooth and, at once, took steps to patent the process which he termed, not anesthesia, but etherization.

A demonstration was arranged for Morton at the Massachusetts General Hospital. At its conclusion, Dr. J. C. Warren, the surgeon who performed the operation, removal of a tumor from a man's neck, stated to the audience, "Gentlemen, this is no humbug."

Three more demonstrations, all successful, followed in rapid succession and anesthesia was launched both here and in Europe. Morton had no scientific interest in his discovery and contributed nothing further to anesthesia. The rest of his life was spent in an endeavor to make a fortune out of it, and in denying the claims of Long and Jackson. The matter received a Congressional investigation and dragged through the Courts interminably.

James Young Simpson of Edinburgh was the first to use ether in obstetrics (Jan. 19, 1847) and early in November of the same year began the use of chloroform in obstretrics. November 15, 1847, he employed choloform in three surgical operations. In a few weeks it had almost displaced ether as a general anesthetic—a position it held for half a century.

There was violent religious objection to the employment of anesthesia in childbirth, based principally upon Genesis III, 16; ". . . in sorrow thou shalt bring forth children." Unable to make any headway against this objection by pleading the merits of his case, Simpson ingeniously met his opponents on their own ground, by quoting Genesis II, 21, and asserting that the "deep sleep" of the first costectomy was anesthesia and God himself was the first anesthetist. The controversy subsided in 1853 when Her Majesty, Queen Victoria, took chloroform during an accouchement.



George H. Dadd, V.S., M.D., headed three veterinary colleges in the 1850's and '60's, edited the American Veterinary Journal, 1851-58, conducted a veterinary column in the Prairie Farmer, 1861-63 and wrote six veterinary text books

Notwithstanding anesthesia was an American discovery, more exercises commemorating a century of anesthesia were held in Great Britain than in this country.

The use of anesthesia in veterinary medicine extended irregularly. Dadd[1] employed chloroform in operating on a horse in 1852, only five years after Simpson introduced it in surgery in Edinburgh. Yet a quarter of a century elapsed and comparatively few veterinarians used anesthesia routinely. After 50 years many seldom or never employed it.

[1] Veterinary Military History of the United States, vol. 1, p. 287.

Correction

On page 427 of the December, 1946, issue, the last word in the fourth line of the fourth paragraph, left column should be "metestrus" not "estrus" as printed. Make the correction *now please.*

Hog By-Product Is Used in Treating Peptic Ulcer

Discovery of a new hormone derived from the mucous lining of the upper intestinal tract of freshly slaughtered hogs, which seemingly heals and prevents recurrence of peptic ulcers, was announced recently at Chicago.

The announcement climaxed ten years of research by a group of scientists headed by Dr. Andrew C. Ivy, physiologist and vice-president of the professional schools of the University of Illinois in Chicago. Medical experts have declared that the long years of experiment have produced overwhelming clinical evidence of a definite cure.

The hormone, which is colorless and called enterogastrone, was isolated at the Northwestern University Medical School. It promises relief for over a million ulcer sufferers in this country alone. It has been tested on 58 human patients, all of whom had suffered from peptic ulcer for at least five years. Improvement in 40 of the 58 tested was reported, including 15 still receiving injections. Only one patient failed to show improvement after treatment. —*Nat'l. Provisioner.*

Foot-and-Mouth Disease in Mexico

The Border quarantine prohibiting the importation of cattle from the Republic of Mexico was reëstablished Dec. 27, 1946, following the discovery of foot-and-mouth disease in four states and in the Federal District of Mexico.

Early last spring the Secretary of Agriculture of Mexico launched a program of importation of Zebu cattle from Brazil for the improvement of native Mexican cattle. The Brazilian cattle were landed in quarantine, on an island off the coast of Mexico and released to the mainland when the authorities were satisfied the animals were not infected with any serious disease.

Because the cattle came from a country in which foot-and-mouth disease is endemic and officials of the U. S. Bureau of Animal Industry thought the imported cattle were not being held in quarantine a sufficiently long period to safeguard Mexican cattle from infection, a quarantine against the importation of Mexican cattle into this country was proclaimed June 5, 1946. Meat was in extremely short supply at the time and this cutting off a source of 40,000 cattle a month raised a terrific uproar from the black market and black market patrons. *Life* contributed a "Hoof-and-Mouth Disease Fraud" story.

Mexico discontinued the policy objected to by our authorities and a joint commission of Mexican and American veterinarians made an investigation to determine if foot-and-mouth disease existed in Mexico. No infection was found and the border quarantine was lifted October 18th.

Señor Oritz Garza, successor to the Secretary of Agriculture who released the quarantined Zebu cattle to infect the cattle of his own country, declares the presence of foot-and-mouth disease in Mexico is a "great national disgrace." *Life* will probably proclaim it a fraud. The livestock industry of Mexico will find it a calamity.

The quarantine includes cattle, sheep, goats, swine, fresh meats and animal feeds.

March of Science in 1946

The 10 most important advances in 1946, according to Watson Davis, Director of Science Service, included two achievements of veterinarians, "Revelation of Biological warfare developments, including vaccine against rinderpest and isolation of botulinus toxin."

The other "First births of animals from foster mothers into which were transplanted ovaries from other animals."

Veterinarians contributed the major share in the development of rinderpest vaccine, a part of the first mentioned advance in science.

The latter achievement was the work of a veterinary practitioner—Dr. Leon F. Whitney, Orange, Conn. It was first reported, shall we say of course, in VETERINARY MEDICINE last month, page 30.

Other scientific advances listed in *Science News Letter* for 1946—which are of special interest to veterinarians include:

1. Commercial production of streptomycin.

2. Development of avian pneumoencephalitis vaccine, and vaccines against fowl plague, psittacosis and tularemia and an improved toxoid for combatting botulinus.

3. Ovaries of white mice were successfully transplanted into female rats.

4. Molybdenum in pastures was found to cause a mysterious cattle disease.

5. Vitamin A was successfully synthesized as was also penicillin.

6. Studies of dog blood serum indicated that dogs, particularly in the eastern part of United States, may be of considerable importance in the Rocky Mountain spotted fever situation.

Rotolactor System of Milk Production Is Offered to Dairymen

The Walker-Gordon system of milk production, which centers around the famous "Rotolactor," or "milking merry-go-round," will shortly be offered to dairymen and milk dealers throughout the world.

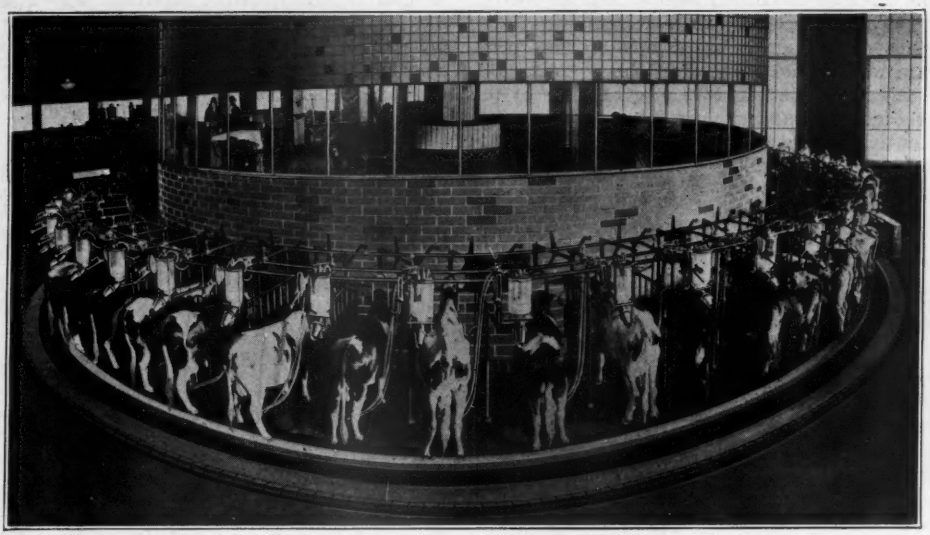
At present there are two such systems of milk production in operation—one at Plainsboro, N. J., the other at Charles River, Mass. It is estimated that rotolactors can be used efficiently in herds of from 300 to 2,000 cows.

The rotolactor at Plainsboro is a platform 66 feet in diameter, revolving once every 13 minutes, upon which 50 cows are milked by DeLaval magnetic milkers in a single revolution. After the cows step on the slowly-moving platform, they are washed, dried, their foremilk examined, and milked.

No hands touch the milk, which is automatically weighed and then flows through sanitary pipe to the dairy where it is processed and bottled. The DeLaval magnetic milking equipment is automatically washed and sterilized after milking each cow. Three times daily 1,500 cows are milked at Plainsboro.

The rotolactor is the keystone to the "Walker-Gordon System of Milk Production" which Jeffers has developed at the Plainsboro farm over the last half century. Control starts with the soil wherein is grown much of the forage consumed by the huge Walker-Gordon herd. It extends to the harvesting and processing of feed crops, to the delicate balance of the cows' diet; finally to the rotolactor operation, the processing of milk and its delivery.

The rotolactor, and the system of milk production of which it is a part, have received wide attention from the world's dairy industry. Before World War II Mr. Jeffers had inquiries from several foreign countries on the possibility of setting up rotolactors in other parts of the world. The outbreak of war put a halt to any such development. More recently, requests of a similar nature have been received from Iceland, Africa, France, South America, and several areas in this country.



The Rotolactor, a rotary milking combine at the Walker-Gordon Laboratories Company, Plainsboro, N. J.

* * * *

The average annual milk production of dairy cows in the United States and Canada is 4500 pounds; of cows in Denmark the average production is 7500 pounds.

* * * *

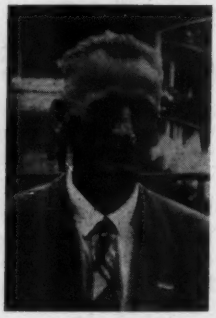
Served Its Purpose

"Contagious abortion" was always a difficult disease to explain to the owner of a herd in which the reactors didn't abort. "Bang's disease" was adopted to avoid embarrassing questions on this score. Twelve years of intensive "educational campaigning" having convinced cattle owners that it is to their advantage to dispose of *unprofitable* reactors, "Bang's disease" is being and should be dropped from the veterinary vocabulary. In the program of the recent regional conference of federal and state livestock sanitary officials at Indianapolis on brucellosis control, "Bang's disease" was not mentioned. Is it too much to hope that we shall not again hear some convention speaker say, "Bang's disease of swine"?

Fiftieth Annual Meeting of U. S. Livestock Sanitary Association*

THE meeting of the U. S. Livestock Sanitary Association held in Chicago Dec. 4-6, 1946, was the 50th annual meeting of that association. President William Moore, Raleigh, N. C., presided throughout the meeting.

One of the first discussions on the program was a brief account of the organization of the association in 1897 and of some of its early meetings and the problems engaging the attention of livestock sanitary authorities four to five decades ago.



A. J. DURANT
Head of the College of Veterinary Medicine University of Missouri. Doctor Durant is successor to Doctor Connaway, one of the early investigators of tick fever in cattle

This historical account was presented by Dr. A. J. Durant, Columbia, Mo., who told the story as told to him by Dr. J. W. Connaway. Doctor Connaway is 87 years of age and is believed to be the only survivor among those who participated in that first meeting, which was held in Fort Worth, Texas, Sept. 28-29, 1897, at the invitation of the Superintendent of the Fort Worth Stockyards.

At that time, the engrossing problem of livestock sanitary authorities in states immediately north of the quarantine line was the regulations under which cattle from the south were permitted to cross the line. Missouri, Illinois and Kansas were principally concerned on the receiving end of such shipments and Texas and Oklahoma as shippers. The special occasion for the meeting was the construction of a dipping vat at the Fort Worth Stockyards, in which, the superintendent hoped, cattle could be dipped and thus rendered acceptable in the markets at Kansas City and Chicago.

The attendance was small at the first meeting. It consisted of livestock producers, railway freight officials and the livestock sanitary officials of Texas and Missouri. The latter being Dr. Paul Paquin, state veterinarian of Missouri and Dr. J. W. Connaway of the state agricultural experiment station. One representative, Dr. Victor Norgaard, of the Bureau of Animal Industry, USDA attended. The meeting was harmonious and so much was accomplished by friendly discussions of their problems that those present decided to form a permanent association and adopted "Interstate Livestock Sanitary Boards" as its name.

A meeting was held in St. Louis† a few weeks later which was attended by Dr. N. S. Mayo of Kansas, Dr. H. J. Detmers of Illinois, and a considerable number of livestock and railroad men from both those states as well as most of those who attended the initial meeting. Of course the efficacy of dipping southern cattle to prevent them from carrying the infection to northern territory turned upon the responsibility of the tick in the spread of the disease. The discovery by Kilborne and associates of the role of the tick in Texas fever, as it was then called, was by no means universally accepted. Paquin, Connaway, Mayo, State Veterinarian of Kansas and Francis of the Texas Agricultural Experiment Station, each had carried on research that convinced them of the soundness of the conclusions of Kilborne and Smith. Dr. Frank Billings (Nebraska) on the other hand had isolated a bacillus which he wordily declared to be the cause of tick

WILLIAM MOORE
State Veterinarian of North Carolina and President of the United States Livestock Sanitary Association, 1946. Doctor Moore's state was the first to be declared a modified accredited tuberculosis-free area (1928) 12 years in advance of the last state to be so designated

*Notes prepared from memory since manuscripts for verification were not available.

†Held on the call of the livestock sanitary commissioners of Illinois, Kentucky and Tennessee.

fever. Detmers stated that he had never in his life heard anything more absurd than the tick theory as to the cause of Texas fever. Nevertheless, a committee appointed at the first meeting to report upon dipping as a means of preventing the spread of the disease pronounced it promising and the report was accepted over strenuous opposition. This report was published the following year in the report of the Illinois Livestock Commission. Missouri Experiment Station Bulletin No. 37, which detailed the Missouri tick fever experiments, was distributed at the St. Louis meeting and was favorably received.

The elder Kleberg, owner of the King Ranch, attended both the Forth Worth and the St. Louis meetings and gave the tick theory powerful support. As Doctor Connaway remembers it, he was the first to suggest that the disease was spread by ticks. It will be remembered that Dr. Cooper Curtis credited priority in this matter to "certain Virginia farmers."

During the next 10 years the association held annual meetings at various points from Denver, Colo. (1903), to Richmond, Va. (1907), and only once (1899) met in Chicago. The 13th (1909) and all subsequent annual meetings have been held in Chicago. The name of the association was changed to "United States Livestock Sanitary Association" at the 1909 meeting. At the recent meeting there was much talk of again holding meetings in various cities, Denver being the favorite for the first out-of-Chicago meeting.

Bovine Tuberculosis, Past, Present and Future

J. S. Meyers, M.D., School of Public Health, University of Minnesota, in discussing this subject said that he had always been intrigued by the far vision, the good planning, the earnest work and the action of veterinarians in the matter of bovine tuberculosis, once the facts were known.

In 1918 the percentage of beef carcasses condemned for tuberculosis at abattoirs having federal meat inspection was 5%; by 1942 it had been reduced to 0.18%, a decrease of 97%. Four million infected cows have been removed from our dairy herds and the production of both milk and beef has increased at the same time. At the outbreak of World War II the United States was in the best position of any nation in the world to supply the 13 million men and women in its armed forces and the much larger number in its war industries with a plentiful ration of meat and dairy products. It also had a large surplus to supply to our allies.

Dr. Mazyck P. Ravenel, a former president of the U. S. Livestock Sanitary Association (1912), was the first to prove, scientifically, that the bovine type of tubercle bacillus is capable of causing tuberculosis in man. Although a great mass of evidence to this effect had accumulated, Ravenel was the first to isolate the bovine type of the organism in pure form from a case of human tuberculosis (meningitis).

No-Visible-Lesions in Bovine Tuberculosis

In a discussion of this subject Dr. C. E. Fidler, Superintendent of Animal Industry, Illinois Department of Agriculture stated that post-mortem reports on reactors to the tuberculin test in which no lesions of the disease were found presents an increasingly serious economic problem.

He regards the N-V-L reactors as resulting from four different causes: (1) cases of recent infection in which there has not been time for lesions to develop, (2) occasional cases of false reaction which is probably to be expected in any allergic test, (3) inexperience of present testing crews many of whom have, because of its rarity, seen few, if any, typical reactions to tuberculin and, (4) sensitization by avian tuberculosis organisms and acid-fast organisms other than *Mycobacterium tuberculosis*.

The speaker regards the fourth as the most prolific source of no-visible-lesion reactors and urged further research to develop a tuberculin that will not give reactions in such cases and also to determine methods of interpreting the test that will not result in final condemnation of such animals.

Various plans of avoiding non-visible-lesion reactors have been tried and, while perhaps all have helped, none have solved the problem entirely. On the theory that cattle are sometimes sensitized by exposure to avian tuberculosis owners have been urged to keep their poultry segregated from their cattle. This is not easily accomplished on the average farm. At present in England a "comparative tuberculin test" is employed. That is, both bovine and avian tuberculin are injected in making a test. The character of the reaction to the two tuberculins differs and plainly indicates to which type of the organism the reaction is due. Others, to eliminate reactors due to acid-fast-organisms other than those of tuberculosis, have advised holding reactors, in herds where the history is such as to indicate that tuberculosis infection is unlikely, for a retest 90 days later and passing as sound those animals that fail to react on the second test.

Report of Committee on Tuberculosis

The committee report expressed grave concern over the slowdown in testing. Bovine tuberculosis is not licked. It is still a menace to the cattle industry and to the public health. During the war tuberculin testing could not be continued as before; not a sufficient number of veterinarians were available, and a system of sampling was adopted with a result that there are some, perhaps many, herds that have not been tested in a decade. Their present status is just not known. The sampling has not always been well done. In some cases veterinarians have been to blame. After testing thousands of animals without finding a reactor the enthusiasm of some individuals has become dimmed and they have become careless and indifferent. Some officials have been culpable. By selecting samples to be tested from areas of known low incidence they have avoided risking loss of accreditation.

R. A. HENDERSHOTT

State Veterinarian of New Jersey and Secretary of the United States Livestock Sanitary Association since 1943. Under Doctor Hendershott's leadership New Jersey has made exceptional progress in mastitis and poultry disease investigation and control

Control of Johne's Disease

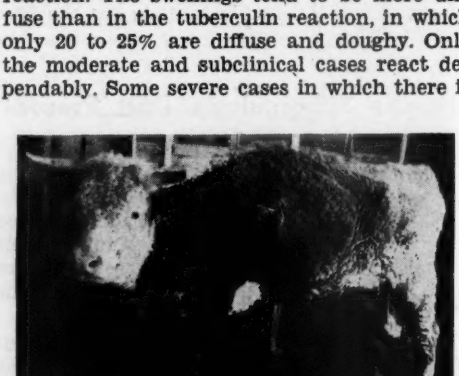
Dr. Howard W. Johnson, Animal Disease Research Station, Bureau of Animal Industry, Beltsville, Md., pointed out that our whole effort in the control of Johne's disease must be directed to eliminating the source of infection. We have no effective means of immunization against the disease and treatment of the infected animal is wholly unsatisfactory. Johne's disease is caused by an acid-fast organism, *Mycobacterium paratuberculosis*. It is a chronic disease, principally of cattle and sheep but the deer and the horse also are susceptible. The disease is present in all sections of the United States, but its incidence is unknown. The Bureau of Animal Industry is now trying to determine the extent of the infection in various sections of the country.

The organism multiplies in nature only in the host. It is difficult to culture and little success is had in inoculating laboratory animals. Its normal habitat on the intestinal mucous membrane results in the distribution of an enormous amount of infective material by the affected animal.

Three types of cases of Johne's disease occur, the severe, moderate and subclinical. The last classification, those which react to the test but exhibit no symptoms, like the other types, are great spreaders of infection. They are far more numerous than the severe or moderate cases.

The johnin test and post-mortem examination are the principal means of making a diagnosis of Johne's disease. Because of the resemblance of *M. paratuberculosis* to other acid-fast organisms it cannot be differentiated microscopically and because of the difficulty in culturing it and in inoculating laboratory animals, examination of the feces and rectal scrapings are helpful in making a diagnosis in only about 25% of the cases, in which there is chronic diarrhea. A stubborn chronic diarrhea is a constant symptom of severe and moderate cases, but, except in herds known to be badly infected, one can only suspect the disease from this symptom alone.

The johnin test may be made by intradermal, subcutaneous and intravenous injection. The intradermal injection is best. It is made by injecting 0.2cc of johnin into the skin. The reaction is read in 48 hours. A swelling 3mm in diameter, or larger, is regarded as a positive reaction. The swellings tend to be more diffuse than in the tuberculin reaction, in which only 20 to 25% are diffuse and doughy. Only the moderate and subclinical cases react dependably. Some severe cases in which there is great weakness fail to react, but can be diagnosed clinically. On necropsy the disease is sometimes signalized by the characteristic lesions of a greatly thickened intestinal wall, which is corrugated lengthwise and can not



Severe case of infection with Johne's disease; however, the subclinical case is a great spreader of infection

be rendered smooth by stretching. However, this macroscopic picture cannot be relied upon for diagnosis. In calves the first six feet of the small intestine is usually involved. In adult cattle 20 feet or more of the gut around the ileocecal valve is affected and in very severe cases the inflammation may extend to, and even include, the rectum.

Johne's disease has a potential of becoming a disease of major importance in this country. The infection is widespread; young animals are the more susceptible age group. The course is long and the possibility of infecting others is great. The economic loss is heavy in some herds. The disease possesses a demonstrated capacity to destroy herds.

A procedure that has been successful in a few instances in developing a non-infected herd from an infected one is as follows:

Isolate the calves as soon as born and keep them in individual 4 x 7 feet pens, having slatted floors 18 inches from the ground. The walls of the pen should extend at least four feet above the floor and be difficult for a man to climb over. The purpose being to isolate the calves completely from all other animals and so far as possible from man carried infection. At from five to seven months of age the calves may be placed in non-infected pastures. Until they reach the age of two years they should be tested every three months and reactors of course eliminated. Any cases of diarrhea that develop should be removed from the herd immediately and segregated until their status is known. Accessions to the herd, other than calves raised as in the foregoing, should be isolated for a period of at least three months and then tested.

In this plan the herd owner's responsibility is greatest and no one can shoulder that responsibility for him.

Cattle Mange and Scabies

Skin disease is common in New York cattle according to Dr. D. W. Baker, Cornell University. Sarcoptic mange is the principal skin disease of cattle in that state and is reportable under both state and federal regulations. The farmer calls this and nine other skin infections "barn itch." They cause him a heavy economical loss in winter. Usually cases of barn itch are not called to the attention of the veterinarian until the case is far advanced. It is important that an accurate, specific diagnosis be made since some cases of infectious dermatitis are reportable, some are not. A filaria worm is common in the skin of animals brought into New York.

From the evidence presented by experienced practitioners and the state and federal veterinarians who participated in the 1945-46 survey, it is safe to assume that there are at least ten specific infections producing the skin disease in cattle which is popularly called "barn itch." It was an accepted fact that sarcoptic mange was the most common, as well as the most serious of these several infections for the winter of 1945-46 in New York State. In the

DONALD W. BAKER
Associate Professor of Veterinary Parasitology, the Veterinary Experiment Station, New York State Veterinary College at Cornell University, New York

group of arachnid or mite parasitisms, the sarcoptic was followed by the chorioptic, psoroptic, and demodectic in order of reported incidence, which is at variance with the conditions existing throughout the United States as reported in USDA bulletins and in the 1942 yearbook entitled "Keeping Livestock Healthy."

Sarcoptic Mange

The *Sarcoptes scabiei* var. bovis lives in the skin and causes an intense pruritus. This parasitic mite which is about 2mm in length is difficult to demonstrate unless the scraping has been taken from the deeper layers of the skin. The best criterion of a satisfactory specimen is the bloody tinge of the scrapings. Mounted specimens of the mite and the pictures and figures in textbooks do not suggest the true appearance of the live animals. When live motile specimens are observed under low power magnification using a binocular microscope these mites appear as oval objects, convex dorsally and more flat ventrally. The adult female is most frequently encountered in the routine examination of skin scrapings although all stages, including the egg, larva and nymph are sometimes seen. The sarcoptic mite in common with other arachnid parasites has no true or distinct head but the mouth parts protrude beyond the anterior end of the body. The nymph and adult males and females have four pairs of legs.

Two pairs of legs are situated towards the anterior part of the body and two more pairs are in the posterior region. The legs are short and the four anterior legs terminate in unjointed stalks bearing suckers. The posterior four legs are equipped with long bristles. The adult male sarcoptic mite is only about ½ as large as the egg laying female. This difference

in size is due to the distention of the female's body with the enormous ovaries and eggs. The egg which has been laid in a burrow is relatively enormous in size when compared with the adult mite. Although some investigators have reported the period of a complete life history from egg to ovigerous female as ten days, the consensus is that 14 days is more normal.

Since sarcoptic mange is a very infectious and quite difficult to eradicate, it is important to explain all the facts relating to the epidemiology, pathogenicity and control to the owner of an infected herd when a positive or verified diagnosis has been made. It is equally important to report the existence of the outbreak to the chief of the Bureau of Animal Industry of the state or to one of his deputies. Detailed information about the parasite, the disease produced and the methods of treatment recognized by the Federal and State Bureaus is available in Farmers' Bulletin No. 1017, issued by the USDA.

Chorioptic Scabies

Chorioptic scabies was found as a fairly frequent infection of cattle in the survey of barn itch, 1946. Epidemiological studies of several outbreaks showed concurrent infections of both chorioptic and sarcoptic mites, sometimes on the same animal. Usually, the lesions of chorioptic scabies are restricted to the legs, the base of the tail, and in the region of the escutcheon. The chorioptic mites cause an inflammatory reaction of the skin which develops rapidly into the typical scabies lesion. The mites live under the scabs and for this reason they are easily found when superficial scrapings are made from suggestive lesions. No contact human cases of chorioptic scabies were reported, although the location of the lesions renders exposure great.

Demodectic Mange

Demodectic mange in cattle is rarely reported in New York. It is probable that many cases are passed by, unrecognized or wrongly diagnosed as some other skin disease. The lesions appear as nodules of varying size and scattered all over the body. There is no seasonal incidence. A thick, white exudate of a waxy consistency can be extruded by pressure after puncturing the nodule with a fine pointed scalpel. It resembles toothpaste as it is delivered from the tube container. The exudate is a mass of mites. Numerous eggs and developing stages along with the adult mites are found when a minute amount of this exudate is examined under magnification. *Demodex folliculorum* var. bovis differs from the species found in the dog and some other animals in many respects. The female of the bovine species is about three and a half times as long as wide while the canine species is six times as long as broad. Epidemiological information is fragmentary and the mode of infection is not well understood. Any nodular skin disease should be investigated.

Psoroptic Scabies

Very few cases of barn itch studied in the 1946 survey were found to be psoroptic scabies. When found, the cases resembled those described for choroptic scabies and the disease picture is very similar. The federal Bureau of Animal Industry reports "psoroptic scabies, although not so dangerous as sarcoptic mange, causes more extensive losses to the livestock industry because of greater prevalence." These are larger and more active mites than the Sarcoptes and may attack any part of the body. Some observations made in the vicinity of Ithaca, N. Y., suggest that certain animals may become resistant to psoroptic scabies and become carrier cases. On one farm an outbreak occurred late in the spring of 1943 in the yearling animals which were turned on pasture before the usual three treatment control program had been completed. No additions were made to the herd and careful examinations throughout the winter of 1943-44 failed to show any infected animals. No additions were made to this isolated herd the next year but an outbreak occurred in the winter of 1944-45. Since no other outbreaks of psoroptic scabies were found and reported anywhere in this part of the state during the interval between the two recounted here, the second outbreak affords presumptive evidence of one or more latent cases of long duration.

Although the mites of the genera Chorioptes and Psoroptes are quite similar in size, shape, motility and type of colony growth on the affected regions of the body, they can be easily differentiated when examined under low magnification. The most obvious difference is in the shape of the mouth parts.

Lousiness

Lousiness is a winter problem in most cattle herds in New York State. The young stock and bulls usually suffer from heavier infections because of a general practice to neglect their care and particularly the grooming which is required by the milking cow to keep her clean. Extreme lousiness causes unthriftiness and may induce skin injury because of the constant rubbing.

The sucking lice may be seen as small dark specks on the hair. When the hair is brushed back, the skin is found to be covered with these insects which are attached and sucking blood. The blood sucking lice are *Haematopinus eurysteruses Linognathus vituli* and *Soleno-*

potes capillatus. The biting louse is *Bovicola bovis*.

Ringworm

Bovine ringworm is infectious but the disease does not spread through a herd in the rapid furious manner characteristic of the mange and scabies parasitisms. Ringworm is caused by a variety of fungus which can be transmitted readily to cattle and to certain susceptible persons. The disease is usually restricted to small spots scattered about on the body but occasionally a very susceptible animal develops a generalized infection which resembles mange. The fungus which causes the disease can be demonstrated microscopically. Cases of ringworm are often mistaken for mange by the cattle owner.

Ringworm does not spread rapidly in the herd

Stephanofilariasis

Stephanofilariasis is a skin disease of cattle caused by a Filaria worm which lives in the skin. A large area of skin on the abdomen may be denuded of hair. This is a so-called old lesion. Young, active lesions exude blood. The only infected herds presently known in New York are beef animals of the Hereford breed. Any suspicious lesions of long standing should be investigated.

No one who has studied the barn itch problem as it exists in the Northeastern United States expects that cattle mange and scabies can be eradicated, at least for some years. One or more of the specific mite infections may exist in a subclinical form while the herd is being given good care and treatment only to break out as a serious disease when this care is relaxed or some other unfavorable circumstance develops. Sarcoptic mange, which is the most serious single infection in the group of diseases, may be kept well controlled if the program developed by the state Bureau of Animal Industry is effectively applied. Anyone who observes a suspicious case should report the fact immediately to the Chief of the Bureau, or one of his deputies located throughout the state. A specimen of the skin scraping should be given a careful microscopic examination, either in the central or field laboratories. A deep scraping from around the edge of the lesion provides the best specimen.

A potent aid to control and eventual eradication is the educational campaign begun in 1945, which makes good use of field meetings of practicing veterinarians and farmers to show and explain how destructive a herd outbreak can become with resultant loss in milk production and waste of feed. The effectiveness of the six treatment program given at 9 or 10 day intervals has been demonstrated. The effectiveness is made more certain by the use of the high pressure large tank sprayer rigs operated by contractors who will arrange to make the application of the 2% hot lime-sulphur solution on the six specified dates. A few of the practicing veterinarians in regions where the disease prevails expect to operate or supervise the operation of these rigs in the winter of 1946-47. Approximately two gallons of the hot solution can be applied to each animal in less than one minute with these sprayers. The effectiveness of the treatment is increased by scrubbing the sopping wet animal with a stiff brush. Benzyl benzoate is an efficient application for eradicating mange, but is expensive for use on cattle.

The educational campaign emphasizes the careful inspection of animals which are sold through the local auction sales and the advice to farmers respecting the short time quarantine provided for purchased animals brought into a herd.

Genesis of Bovine Mastitis

In 1937 Dr. James M. Murphy of the New Jersey Agricultural Experiment Station undertook a longtime study of mastitis in a herd comprising 60 guernsey and 60 Holstein-Friesian cows. Both breeds were handled in the same manner and results of the study were not permitted to effect the handling, in fact were not known to those in charge of the herd.

The study was continued for seven years; the observations being filed away as made. At the end of the period of study, the record was evaluated.

The outstanding feature of this study was the showing that in this well-managed herd, averaging 120 milk cows, the incidence of streptococcic mastitis throughout the period was definitely correlated with the age of the animals. Staphylococcic mastitis did not follow this pattern.

The incidence of streptococcic mastitis rose rapidly after the third lactation period. The incidence of staphylococcic mastitis was fairly

level at all ages. At all ages mastitis was slightly more prevalent among the guernsey cows than it was among the Holstein-Friesian cows.

So exact is the correlation between age and the incidence of streptococcic mastitis the author thinks that given the age of the cows in any untreated herd one should be able to tell the approximate number of infected animals without examining or even seeing the herd. Further to lower the incidence of the disease it is necessary only to dispose of the older animals. He thinks improved sanitation and better methods of milking may have been given credit for lowering the incidence of mastitis in certain herds, when the improvement was actually due to disposal of many of the infected animals and in this way reducing the average age of the cows in the herd.

By keeping cows for only the first and second lactation periods it is possible to have a herd at all times practically free from mastitis. Unfortunately it is uneconomical to solve the mastitis problem in this way.

To lower the incidence of streptococcic mastitis, dispose of the older cows

Theoretically, to maintain a mastitis free herd is to manufacture an epidemic situation. Just that has happened. Hasting and Beach maintained a herd free from mastitis for 3½ lactation periods and then got an infection. In seven months 40% of the animals in the herd were infected which was just about a normal incidence for the average age of the herd. An Australian experiment also illustrates the same principle.

Stableforth reported a greater incidence of mastitis in large than in small herds. Bryan found the same to be true of Michigan herds. In New York, on the contrary, the incidence is highest in small herds. Some have found the incidence higher in machine milked than in hand milked herds and others have reported just the opposite. Some have reported a decrease in the prevalence of the disease as a result of sanitation and segregation, but none have given the age of the animals with which they were working. No statistics are useful unless we know the ages of the animals.

The author thinks our approach to research on mastitis and methods of control need radical revision.

Brucellosis Research

Dr. C. K. Mingle, Agricultural Research Center, Beltsville, Md., discussed the history of brucellosis research and the problems still pressing for solution.

Before the turn of the century much was known about the Brucella organisms. Twenty years ago, it was known that the young calf was rarely infected and the bull was not an important spreader of the disease. It was also known that the infected cow often eliminated organisms in her milk. Vaccination studies were well along at that time and it was known that vaccination with virulent organisms was capable of establishing foci of infection in the udder.

In those days and since, vaccination was often severely criticized but research workers never failed to value its importance and to strive to improve the product.

It was apparent to research workers before the cooperative brucellosis control project was undertaken, that the test and slaughter method was too difficult for general application and was sometimes of no value in controlling the disease. The best time to use it was when clinical manifestations in the herd had subsided, but it was not practical to so limit its use, if the problem of general control was to be solved.

The discovery of Strain 19 has been of incalculable value. That discovery has been acclaimed by all authorities. It was soon learned that adult animals, when vaccinated with Strain 19, commonly reacted for a long period, but calves usually became negative to the agglutination test in three months to a year.

It is now recommended that calves be not vaccinated at less than six months of age, and some research workers place the minimum age for vaccination higher than six months.

Strain 19 has been thoroughly tested by many workers. No one has been able, by any means, to make it assume virulence. Vaccinated cattle are not a menace to susceptible animals, even under conditions of extreme exposure over a period of several years.

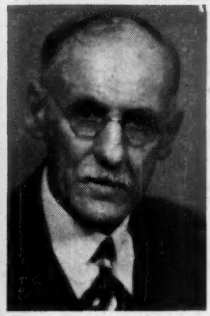
The duration of immunity following vaccination with Strain 19 is not definitely known. Field experiments indicate that it lasts for four or five pregnancies.

Intradermal injection of the vaccine appears to be inferior to subcutaneous injection, but the question is not decided and is still being studied.

Vaccination causes a lowered production for three to 10 days in non-infected lactating cows. It has no effect on infected animals.

Modification of the customary procedure in vaccinating animals is not justified by research at the present time. Employment of intradermal injection and other modifications should await further controlled experiments.

A critical factor in the use of Strain 19 is preservation of the vaccine until it is used. Much attention has been given to vacuum drying. The dried organisms retain their vitality well, but excessive numbers are killed in the process of drying.



WILLIAM EDWIN COTTON
None other in our history has contributed so much to our knowledge of bovine tuberculosis and bovine brucellosis as has Doctor Cotton. Heeding signboards erected by his research steered TB eradication to victory. Disregarding them in brucellosis eradication mired the project and, after six years,* it had to start anew from scratch

Chemotherapy and the new antibiotic agents have been very disappointing in the treatment of the brucellosis control and eradication proj-preciable response and the results from the use of penicillin have not been materially beneficial. Streptomycin is more effective but not a satisfactory cure for the disease.

Brucellosis and Livestock Production

One of the most valuable discussions of the whole meeting was a sort of cattleman's view of the brucellosis control and eradication propect, by the Hon. W. L. Baird, a breeder of purebred cattle and owner of a certified brucellosis-free herd of purebred dairy cows at Waukesha, Wisconsin.

Mr. Baird stated that regardless of how much cattlemen disagree about the methods of control of brucellosis, there is one thing on which they are unanimous—the high cost of the disease.

He had a bad experience with the disease and had cleaned his herd the hard way—by the blood test and the slaughter method. What the cattlemen want and what is urgently needed is a better plan of brucellosis control than has yet been offered to them.

The brucellosis project was offered to the cattle industry at a time when all were enthusiastic about the success of the tuberculosis eradication project. Breed organizations welcomed the campaign with high hopes. Our livestock and farm papers lauded the plan unstintingly. Everyone expected the success of the tuberculosis eradication campaign to be duplicated. Perhaps we weren't told this officially but certainly no one corrected us. We were told that 15% of our cattle were infected. The states took up with the project avidly.

In the beginning the cattle breeder was satisfied with the process of eradication on the test and kill basis, because cattle were cheap. When higher cattle prices came, breeders began to scan the progress reports with anxiety and found no solace in them. After 1940 Wisconsin incorporated vaccination in the program. This has given the breeder something he can tie to. The demand for vaccinated heifers far exceeds the supply. Persistent reactors among heifers after vaccination represent no vaccination loss since the heifers that cease to react sell for enough more than unvaccinated heifers to more than make up for them.

The cattle industry would be better off if promiscuous vaccination of adult cattle were prevented. But permits to vaccinate adult cattle should be granted on the request of the owner of the cattle and his veterinarian.

The regulations should be elastic enough to permit exchange of cattle between herds in the same condition.

Is the persistent reactor after vaccination a danger? Why can't a breeder get an answer to that question and a scientific reason for discrimination against her? In the early and late years of tuberculosis eradication, livestock men in plentiful numbers attended these meetings. They don't attend them now. The brucellosis control project is widening the gulf between the cattlemen and the regulatory officials. It is wider now than it was 25 years ago.

Breeders would like answers with scientific support for these questions:

1. What is the proper age for calf vaccination?

2. Is there a sound reason for eliminating the persistent reactor (after vaccination)?

3. Why do persistent reactors (after vaccination) sell as well as vaccinated non-reactors? Does that represent the appraisal of experience?

Some things that are necessary to the success of the brucellosis control project are:

1. Better understanding between livestock men and livestock sanitary officials.

2. More uniform regulations governing the shipment of cattle from one state to another.

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*Doctor Cotton, then Superintendent of the B. A. I. Experiment Station, reported in 1932 that there are many herds from which brucellosis cannot be eradicated by the test and slaughter method, and that no single method is applicable to all herds.—*J. A. V. M. A.* 81, p. 496.

3. A consideration of ways and means of promoting calf vaccination.

4. A realization that tuberculosis and brucellosis are different diseases and require different means of control.

Brucellosis Control in Oregon

The discussion of this subject by Dr. Sam Foster, Inspector-in-Charge, Portland, Oregon, was an anachronism—a page out of 1935 or 1936 history. It was useful as a reminder of the cerebration of a good many livestock sanitary officials 10 years ago and served to demonstrate the progress that most of them have made since that time. Doctor Foster has forgotten nothing that he knew when the brucellosis eradication project was blithely launched 12 years ago.

Oregon cattle owners though, apparently have learned since those trusting days. Doctor Foster complains they have been wrongly informed on brucellosis by "commercial interests." That there is hesitancy on their part when it comes to signing up for the test and kill, is indicated, by the necessity he finds for throwing a scare into them. The scare is accomplished by sending cattle owners a questionnaire asking if there has been an illness in the family, if any member becomes unduly tired from his work, if any suffer night sweats, etc., and urging them to abstain from the use of dairy products and fresh meat, presumably till they have their cows tested and killed if he finds that necessary.

Brucellosis frequently causes hygroma of the knees

The speaker wants full time veterinarians for brucellosis work "since we have full time dog catchers." We think that can be put down as unique among arguments for eliminating practitioners from disease control activities.

Oregon cattle raisers appear to have contracted considerable of a vaccination rash, possibly from those unholy "commercial interests," but Doctor Foster has saved an oasis to which to retreat. He has one county in which no vaccination for the prevention of brucellosis has been done—not even one calf vaccinated. No wonder Doctor Shahan states that the far-flung agricultural extention service is not doing a satisfactory job of educating livestock owners.

Later in the day the Chief of the Bureau of Animal Industry stated that the cooperation of veterinary practitioners in large numbers is essential to the success of the brucellosis control program and condemned unreservedly the action of a veterinarian who opposed vaccination for personal reasons. Although apparently not planned as a rebuke to the speaker, the Chief's remarks constituted no less.

Human Brucellosis

Wesley W. Spink, M.D., Associate Professor of Medicine, University of Minnesota, in a discussion of human aspects of the over-all brucellosis problem in this country stated that the physician is not going to control the disease in man. "Its eradication in man depends upon its eradication in animals."

Human brucellosis is a major public health problem and a serious one. Its prevalence in this country is increasing steadily. The extent of the disease is not generally realized because, being extremely difficult to diagnose, it is commonly diagnosed as influenza by rural practitioners and others to whom laboratory facilities are not readily available.

Human brucellosis resembles human tuberculosis in many respects, particularly in insidiousness, chronicity and resistance to treatment.

There are three types of brucellosis in man:

1. *The infection due to the abortus type.*—This constitutes 80% of the cases. It is a relatively mild disease and is usually contracted from contaminated milk, except that many cases among the rural population are due to animal contacts. There is no question about it being milk borne. The speaker has seen it in children who had contracted it from certified milk—all other possible sources of infection were excluded and the organisms were found in the milk supply.

2. *The infection due to the suis type.*—This constitutes approximately 20% of the cases seen at the University (of Minnestota) Hospital. It is more severe than the abortus type of the disease and has a tendency to become chronic. Cases running 10 years or longer are common.

Br. Suis infection is usually acquired by animal contact. Packing house workers, farmers and veterinarians are the groups chiefly involved.

3. *The Melitensis type.*—This is the most

serious of the three types. It is rare in this country. No cases have been diagnosed in Minnesota, but it occurs in Iowa and probably also in Minnesota. Within recent weeks we have had some evidence of it there.

The outstanding symptoms of any type of human brucellosis is weakness, pains in the muscles and articulations, cough and sweating. In 80% of the cases there is an undulating temperature; 20% are afebrile. In acute cases there may be chills.

A university student was brought to the hospital a few days after school opened last fall complaining only of chills, sweats, headaches and weakness. Based in part on the history, his case was tentatively diagnosed as encephalitis due to the equine encephalomyelitis virus. This diagnosis was later changed to typhoid fever and finally to undulant fever.

In addition to the general infection this virus shows a great tendency to establish local foci of infection, usually in the liver, spleen or bone marrow; rarely in the heart. At the University Hospital an increasing number of cases of back involvement—focal infection of vertebra are being seen. Ambulatory afebrile cases may have serious tissue involvement. When the infection localizes on the heart valves it terminates fatally.

Treatment of brucellosis is very discouraging. Sulfonamides are not the answer. Penicillin is of no value. Streptomycin gives only temporary improvement. With bed rest and immobilization the prognosis is good. Chronic cases are improved by desensitization.

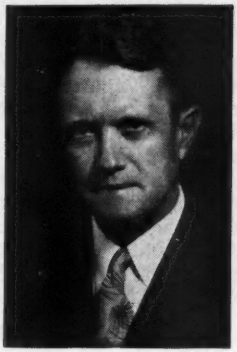
Report of Brucellosis Control Program

Chief of the Bureau of Animal Industry, Dr. B. T. Simms prefaced a report on the cooperative brucellosis control program by a few remarks on the tuberculin testing of cattle. During the fiscal year 1946 (ending June 30, 1946), 8,454,463 cattle were tested and 19,464 reactors found (0.23%). This brings the total cattle tested since the tuberculosis eradication project was initiated 28 years ago to 287,689,953 and the total number of reactors to 3,911,414.

During the past year the lowest percentage of reactors (0.002) was found in North Carolina. Montana with 0.02; Florida with 0.03; Mississippi with 0.05; Arkansas and New Hampshire with 0.06, and Kentucky, New Mexico and Washington with 0.07 compete for low place in the order named. No tuberculin reactors were found among the 833 cattle tested in the Virgin Islands nor among the 3541 tested in Nevada.

The brucellosis project was divided into two six-year epochs—1935-40 during which the average degree of infection decreased as shown by the number of reactors to the agglutination test and 1941-46 during which the average infection increased as indicated by the same criterion.

The high point in the number of cattle tested for brucellosis was reached in 1937 (8,021,167). Last year was low point in the number tested (4,876,866) except for the first year of the campaign. The percentages of reactors was the same (5%) in both 1937 and 1946.



U. S. D. A. Photograph

DR. BENNETT T. SIMMS
Chief of the Bureau of Animal Industry, Agricultural Research Administration, USDA, and President of the American Veterinary Medical Association

Vaccination is an extremely useful agent in freeing herds from brucellosis. Notwithstanding vaccination of adult animals confers marked resistance to the disease at the present time, it is advocated only in herds in which there is slight prospect of ridding them of the infection otherwise. The calves vaccinated number about two million annually.

Brucellosis continues to be one of our serious livestock diseases. When present in a herd it usually eliminates all the net profit from that herd. Public health aspects of the disease are receiving more and more attention. Veterinarians, cattle owners and cattle breeders must accept the responsibility for safeguarding human health from brucellosis. One-half of our population consumes raw milk more or less regularly and a considerable number are exposed to the disease by contact with animals or their carcasses.

We must step up our program of control. At present only 12% of our female cattle are tested annually and in the same period only 20% of our heifer calves are vaccinated. At this rate, if every vaccination gave perfect results we would never have more than one-third of our cattle protected. We can increase

the vigor of our attack on this disease without the slightest danger of depriving any of our population of milk or milk products.

Since our federal and state forces cannot be materially increased we must rely upon practitioners for pushing the plan more rapidly. The program is more successful in some states than in others. The attitude of cattle owners is most important. Informing the cattle owner in the matter of disease control is the special field of the practitioner. We have no place in this work for any who are just bleeders and injectors. That is not what we mean by testing and vaccination. All the success we have had heretofore in animal disease control projects, has been where such projects were in the hands of a trained personnel.

The job is stupendous but it can be done. The program must be enlarged; a new personnel must be had; livestock men must cooperate fully. To achieve success will tax the ingenuity of everyone concerned.

Report of Committee on Miscellaneous Transmissible Diseases

Dr. Charles R. Schroeder, Pearl River, N. Y., reported that the immediate need in the matter of transmissible disease, other than those for which there are control projects in operation, is for the collection of statistics concerning them. Where are they? How prevalent? What loss are they causing? Where did they come from? How fast are they spreading? What control measures are being employed? etc.

We need a uniform nomenclature for animal diseases and a uniform manner of reporting them.

In discussing Doctor Schroeder's paper, Dr. R. C. Newton, vice president of Swift & Company and chairman of the section on veterinary research of the National Research Council stated that one reason for collecting statistics is their extreme value to veterinary research and regulatory services.

Further, without information on morbidity and mortality in animals, we are unable to determine how many veterinarians are needed, how they should be educated, where they should be, what they should do and what their relation should be to livestock raisers.

The section on veterinary research of the National Research Council has been studying methods of obtaining this information. One method being tried in Iowa is sampling. Doctor Dodd has been employed to collect veterinary vital statistical information from representative farms in that state. He learns how many animals of each species there have been on the farm during the year, how many have had a disease, how long were they sick, what was the loss in growth, how many died, what was their value, etc.

The USDA Regional Swine-Breeding Research Farm at Ames, Iowa, which has developed a statistical method for computing gains and losses in swine breeding and production operations, has been asked to devise a statistical method for computing losses due to disease. The experiment stations in all the states have been asked to compute the loss in their areas due to disease in each species of farm animals, *i.e.*, the average cost of an attack of each of the common diseases in one farm animal.

When a satisfactory method of sampling has been developed for farms a similar plan will be worked out for the range section of the country.

The speaker has little idea, as yet, what the cost of animal disease in the whole country may be but he thinks it may be between two billion and five billion dollars annually. Not all of the loss can be prevented by the best of veterinary service, but if 10% of the lesser amount can be saved, the employment of twice as many veterinarians as are now practicing would still be economically sound.

Report of Committee on Parasitic Diseases

Parasitic investigation was continued during the past year as in previous years. In addition to developing methods of using DDT, experiments were undertaken with gammexane (benzene hexachloride) according to Dr. Benj. Schwartz, chairman of the committee, but they are not able, as yet, to outline its exact field of usefulness. One dipping in a suspension of cube or derris powder and DDT completely eradicated the short-nosed blood sucking louse and the biting louse from cattle. The residual effect of DDT killed the young lice as the eggs hatched. The mixture may be applied effec-

BENJ. SCHWARTZ
Principal Zoologist in Charge, Zoological Division, Bureau of Animal Industry, USDA. Cooper Curtice, Charles Wardell Stiles, Brayton H. Ransom and Maurice C. Hall, Doctor Schwartz' predecessors set a record of achievement that leaves him no opportunity to rest on his laurels, albeit he has many

tively with a power sprayer. Spraying sheep with 0.5% wettable DDT gave good blowfly control for six weeks.

Sodium fluoride continues to give good results as an ascaricide for pigs. The technical grade powder is mixed with ground feed at the rate of 1% and fed for one day. It is too early to evaluate its disadvantages. Gastroenteritis in any form is a contraindication for the use of sodium fluoride.

Parasite control enables growers to produce larger and better lambs. Phenothiazine is credited with adding a million dollars a year to the income of sheep raisers in Kentucky.

Lead arsenate continues to be successful in the treatment of scours in lambs in South Dakota.

A Solid Foundation for Veterinary Science

The basis for veterinary medicine in this country was examined by Dr. M. S. Shahan of the B.A.I. and found to be sound.

Organized veterinary medicine is almost 100 years old in this country. The U. S. Livestock Sanitary Association is 50 years old. The record is a good one, even a great one. Some serious plagues of livestock have been eradicated—bovine contagious pneumonia, foot-and-mouth disease and, for practical purposes, dourine and glanders may be added, and a larger number of even more serious plagues have been denied entrance into the country. The prevalence of bovine tuberculosis and of tick fever of cattle has been reduced more than 98%. Means that make possible the eradication of rabies and the control of hog cholera, infectious equine encephalomyelitis and other diseases have been developed. A federal meat inspection service not surpassed anywhere has been carried on for many years and a system of food inspection has been developed in the Army which is unequaled in any other military force.

But not all the problems of veterinary science have been solved. Research has been the foundation upon which the progress of veterinary medicine has been made but, unfortunately, it has lagged in recent years.

Our educational standards have been raised and opportunities for graduate study in the field of veterinary medicine are increasing, but we must not forget that disease control requires education of the livestock owner as well as the veterinarian and this is being neglected. Our far-flung agricultural extension service is not accomplishing this in a satisfactory manner.

We lack sufficient information as to the whereabouts and prevalence of livestock diseases to plan intelligently to handle them. Doctor Van Es is quoted as once saying that one undertaking the control of a disease without knowing the distribution and incidence of that disease is like a sailor on an uncharted sea. Some one else has compared a disease to a fire in that one cannot do much about it until one knows where it is and how much of it there is.

We have fairly accurate data on the distribution and incidence of only tuberculosis, brucellosis and equine encephalomyelitis. Of very recent years we have been accumulating information on rabies but we get our reports only once a year and, in most instances, long after the time when anything might be done about it.

The facilities of state offices is a limiting factor in the collection of veterinary vital statistics. Diagnostic laboratories should be developed for all diseases of all animals in all states. We shall probably never know what the lack of such facilities for the past two years has cost in the matter of avian pneumoencephalitis—to cite a single example. Such facilities are most necessary for the functioning of our regulatory services. This association should initiate a demand for them. Such laboratories could become centers for the collection of veterinary vital statistics. A major impediment to disease reporting is the failure of practitioners to realize its value. Diagnostic laboratories could largely overcome this handicap.

Livestock Disease Prevention and Control in Canada

Dr. Orland Hall of the Health of Animals Branch of the Canadian Department of Agriculture in notable suaviloquence complimented the United States federal and state veterinary services on their many worthwhile achievements.

He described the Dominion veterinary service stating that, because of the planning of farseeing pioneer veterinarians the health of animals has at all times kept abreast of or ahead of public opinion in Canada.

The audience showed particular interest in the methods of handling hog cholera and rabies by the excellent Dominion and Provincial veterinary services. Canadian achievements in the control of these diseases have no parallel south of the border.

Prompt action when a case of rabies occurs in Canada and strict regulations governing the importation of dogs from Europe, Asia, Africa and the United States have kept Canada practically free from this disease for many years. One case occurred in Essex County during the

past year. The disease spread to two additional dogs, but no new cases have appeared for several months and the outbreak is regarded as stamped out.

Hog cholera occurred during the year on six premises in New Brunswick and four in

The feeding of raw garbage is prohibited—no hog cholera occurred on garbage feeding premises

Ontario. No cases occurred on any of the 665 licensed garbage feeding premises on which 63,000 hogs are fed. The serum-simultaneous vaccination for the prevention of hog cholera is prohibited in Canada. The feeding of raw garbage also is prohibited.

There is no official vaccination of calves against brucellosis in Canada, but practitioners are encouraged to do such vaccination.

Of the 10,385,000 cattle in Canada four million are in modified accredited tuberculosis-free areas. About 5000 dairy cows are exported from Canada to the United States monthly, and thereby hangs a tale.

The background of this whole speech is the fact that these imported cows, going chiefly into the eastern and northeastern states have been reacting positively to the tuberculin test in disconcerting numbers.

Because of this experience the livestock sanitary authorities of the states concerned, petitioned the federal B.A.I. to tighten up on the regulations governing cattle importations from Canada on the grounds that Canadian regulations for the shipment of cattle into accredited areas are not adequate for the protection of cattle in those areas and that tuberculous animals are exported with health certificates.

Doctor Hall stated that on occasion Canadian cattle have reacted to the tuberculin test in the United States and investigation had indicated the substitution of uncertified for certified cattle and changing of ear tags, by unscrupulous dealers. Fines of $50 to $1000 have been assessed against three dealers and cases are pending against several others.

The speaker then went on to make the astonishing statement that he thought much of the substitution of diseased cows for those certified as tuberculous free occurred after the cows were imported into the United States, but before they were sold. His audience smiled broadly at this, which may have been why he did not explain how dealers would find reacting cows on this side of the border to substitute for the healthy Canadian cattle. When it is recalled that often a thousand or even a larger number of animals must be tested in this country to find a single reactor and such tests would have to be made surreptitiously and at an expense to the dealers in excess of the selling price of reacting animals found on the test—the reason why the speaker did not go into detail can be appreciated.

Crystal Violet Vaccine

In a report on crystal violet hog cholera vaccine Dr. C. G. Cole, Ames, Ia., reminded the audience that it was first produced by Dr. Marion Dorset in 1934. Since the death of Doctor Dorset it has been produced under the direction of Dr. Harry Schoening of the Pathological Division of the Bureau of Animal Industry, USDA. The speaker reported to this association on the development of crystal violet vaccine in 1940 when but 12,500 hogs had been vaccinated with it. In the six years that have elapsed since the former report, the vaccine has come into common use in this country and it is in use in Britain, Argentine, Brazil and other countries. Over 4½ million doses of commercially prepared crystal violet vaccine were used in the past season.

In a large number of tests 96% or more of the vaccinated animals have survived the injection of 5cc to 10cc of virulent virus from one month to 13 months after the vaccination. However, of those that survived, some 10% suffered a more or less severe reaction following the injection of the virus.

In a test to determine how soon after the administration of hog cholera antiserum the vaccine can be used successfully, it was found that four weeks is the minimum time. Vaccine given simultaneously with the serum and up to four weeks afterward was wholly ineffective in protecting the animals from a later injection of virus.

The potency of vaccine, produced from different pigs, is not uniform. Investigation to determine the reason has shown it is not related to the virulency of the blood from which it is made nor to the amount of virus injected nor to the strain of virus used. It can be said only that the reaction of different individuals

to hog cholera virus differs for reasons unknown.

Keeping the same strain of virus offers some difficulty. Attempts to preserve it by freezing and holding at low temperatures have been successful for periods up to six months. How much longer it may be held without loss of virulence has not been determined.

Recently a material improvement in the vaccine has been made by a modification of the manufacturing process. The vaccine is now prepared as follows:

A. *Materials.*—1. Defibrinated virulent virus blood, freshly drawn with aseptic precautions from pigs sick with acute, uncomplicated hog cholera induced by the injection of virulent virus. This blood should be drawn from the pigs from the sixth to the eighth day, inclusive, after injection of the virus. The blood is chilled immediately after drawing by immersing the container in cracked ice.

2. Crystal violet, extra pure, to contain at least 85% dye.

3. Glycerol, C. P.

B. *Methods.*—1. Preparation of dye solution: One gram of the crystal violet is dissolved in 400cc of the glycerol with the aid of heat.

2. Preparation of the vaccine mixture: With aseptic precautions 200cc of the glycerol-dye solution is added to 800cc of defibrinated blood virus.

3. Attenuation: The vaccine mixture is held at a temperature of 37.5° C. for 14 days, being agitated sufficiently to distribute the sediment uniformly at least once each day. At the expiration of this period the vaccine is then ready for use and the containers are placed in cold storage.

Report of Committee on Transmissible Diseases of Swine

As has been the custom in previous years, Dr. H. C. H. Kernkamp, St. Paul, Minn., sent

H. C. H. Kernkamp, Professor of Veterinary Medicine, Veterinary Division, University of Minnesota, University Farm, St. Paul

a questionnaire to the livestock sanitary officials of the principal swine producing states and from a compilation of the answers he received reported the following:

The decrease in the prevalence of swine disease reported in 1944 and 1945 continued in 1946.

Swine influenza was less prevalent in all states in 1946 than in 1945.

Only one state reported an increase in swine erysipelas. Three states reported a decrease and the others about the same amount of this disease.

Brucellosis increased in most of the states. This was true a year ago also.

Little change was reported in the amount of tuberculosis, enteritis, swine pox, scabies, pulmonary strongylosis and ascariasis. Three states reported a slight increase in sarcoptic mange.

There were no reports of pseudo-rabies.

Salmonellosis of Domestic Animals

Dr. D. W. Bruner and P. R. Edwards of the salmonella classification center, University of Kentucky, reported briefly on some of the work of the center during the past year and preceding years.

In May, 1946, the center identified its 10,000th culture of Salmonella. Of these 1377 cultures were from organisms infecting man, 1289 were from other animals and the remainder were from fowl. The number of types of Salmonella isolated from various species of animals and the number of outbreaks in which they were involved follow:

No. Types Salmonella	Species	No. Outbreaks
3	horses	42
11	cattle	60
6	sheep	33
2	other ruminants	2
38	swine	958
4	dogs	18
7	foxes	74
5	other carnivora	6
5	rats	18
4	mice	23
4	guinea pigs	29
2	other rodents	13
10	reptiles	8
5	lower primates	5

The 12 most commonly occurring Salmonella types, the number of species of animals from which they were isolated and the number of outbreaks in which they were involved follow:

Organism	No. Species	No. Outbreaks
S. typhimurium	15	188
S. dublin	2	39
S. bredeney	3	22
S. abortico-equina	1	27
S. anatum	6	22
S. newport	7	20
S. paratyphi B	4	13
S. worthington	3	13
S. give	1	10
S. enteritidis	6	44
S. derby	3	19
S. choleraesuis	7	795

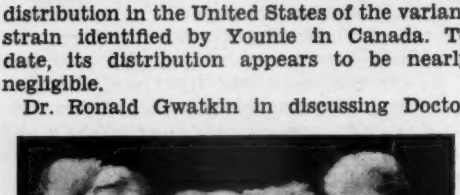
The above together with 34 additional types which occurred less frequently appeared in 23 different species of animals infected other than man or fowl and produced 1289 outbreaks of disease in these animals in which Salmonella organisms were involved.

Antigenic Behavior of Salmonella Pullorum

In discussing the effect of form variation on the antigenic behavior of *Salmonella pullorum* Dr. P. R. Edwards, University of Kentucky, pointed out that it has long been known there are certain differences in strains of *S. pullorum* and these differences affect the reaction of the organisms to pullorum antigen. It remained however for Younie in 1941 to call attention to the effect of these differences in the pullorum disease control plan. Younie's excellent work was fully confirmed by Gwatkin (1945) and it is now evident that we should not regard *S. pullorum* as a single organism but as a Salmonella group.

Some effort has been made to ascertain the distribution in the United States of the variant strain identified by Younie in Canada. To date, its distribution appears to be nearly negligible.

Dr. Ronald Gwatkin in discussing Doctor



Pullorum in young chicks

Edwards' paper related that he had experimented with combined antigens in an effort to produce a product that would give a reaction to both the common strain and the variant strain of *S. pullorum*. This had been achieved in the whole blood test but not in the tube test. In the latter it is necessary to use the antigens separately.

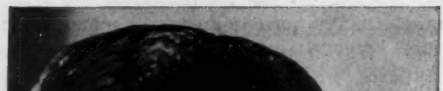
Control of Fowl Typhoid

Fowl typhoid was discussed by Dr. W. J. Hall, Pathological Division, B.A.I., who stated that this disease is widespread in the United States, Europe and Africa. It was first recognized in this country in 1895. In 1902, Theobald Smith and Cooper Curtis suggested the present name.

In this country fowl typhoid is most prevalent in the seaboard states from New Jersey to Alabama. In these states it is one of the greatest hazards to commercial broiler production.

Symptoms

Chickens affected with acute fowl typhoid have ruffled feathers and a drowsy appearance. Symptoms of this disease are paleness of the head, with a withered drooping comb, and a diarrhea which stains the vent feathers a pale-orange color. Affected birds are inclined to stay close to the watering fountain because of the great thirst caused by the high temperature which is characteristic of the acute



Fowl Typhoid

stage of the disease. The incubation period is three to four days. In fatal cases death occurs within one to two weeks after exposure. Chickens, ducks and guinea fowl are susceptible.

Lesions

On post-mortem examination of an adult fowl that has died of acute typhoid, marked enlargement of the liver, spleen and kidneys is usually noted, but in very acute rapidly fatal cases little change in the carcass may be seen. The liver is usually spongy and easily ruptured. The color is lighter than normal and of a mottled, brick-red color with pale streaks. The spleen and kidneys are usually greatly swollen and engorged with blood. The ovaries are frequently flaccid, highly congested and often ruptured, in such cases yolk material may be found throughout the abdominal cavity.

In the later stages of an outbreak, the disease becomes more chronic and one may notice a green-bronze color of the liver with sometimes grey, pinpoint spots. Grey nodules may sometimes be noted in the heart muscle and occasionally in the intestinal wall. The fluid in the heart sac is frequently cloudy. In the more chronic cases the ova sometimes become caseous and angular, resembling pullorum disease.

In young chicks the lesions are similar to those in the acute type of the disease in mature fowl, *i.e.*, enlargement and congestion of the liver, spleen and kidneys. The extent of the lesions in chicks depends upon the length of the attack.

Diagnosis

Fowl typhoid must be differentiated from pullorum disease, fowl cholera and pullet disease. The causative organism of fowl typhoid *(Shigella gallinarum)* and of pullorum disease

(Salmonella pullorum) are identical serologically and resemble one another closely microscopically. However, they have slightly different cultural characteristics. Both organisms cross-agglutinate one with the other.

In adults, pullorum disease usually assumes a chronic form with ovarian lesions and only an occasional death, whereas in fowl typhoid the disease is usually acute in the beginning of an outbreak, with high fever, severe depression and definite lesions. As a result the mortality is high.

In the later stages of an outbreak of fowl typhoid prominent lesions, such as grey nodules on the heart, infection of the pericardium, a bronze-colored or chocolate-colored swollen spleen and flaccid easily ruptured ova may develop. In pullorum disease the most common lesion is the blighted ovary, in which the ova undergo caseation and become angular, pedunculated and discolored. Infection of the pericardium with cloudy fluid is common in both diseases.

Fowl Cholera.—At the beginning of an outbreak of cholera, chickens frequently show no symptoms and few or no lesions, and die suddenly. Later in the outbreak they are greatly depressed and take little or no feed or water. The head is often dark red, and there may be diarrhea with grey or greenish discharges. The causative agent *(Pasteurella avicida)* may localize (1) in the mucous membranes of the head causing a coryza, (2) in the wattles causing pronounced swelling, (3) in the joints causing lameness and swelling or (4) in the ovary, in which case the ovary may become caseous or may rupture and cause peritonitis.

In cholera the liver is lighter in color than in typhoid, splenauxe is seldom marked and pinpoint hemorrhages are often seen in the intestines, on the heart and gizzard fat and throughout the abdominal cavity.

Pullet Disease.—In this disease the head is congested and bluish. The liver is enlarged with evenly distributed yellow pinpoint spots. The spleen is about normal in size. The abdominal organs are usually congested. The pancreas may appear chalky and the kidneys may be swollen as in gout. The intestines contain an increased amount of gelatinous mucus. General dehydration is usually in evidence and pale, fish-like areas may be seen in the muscles. The disease is more common in hot weather than at other seasons and pullets in good flesh are the birds most often affected. No significant bacteria are recovered on bacteriological examination. The outbreak can be controlled by increasing the potash in the diet.

It should be emphasized, however, that only a tentative diagnosis can be made by observation of the symptoms and lesions in fowl typhoid, fowl cholera and pullorum disease. A positive diagnosis can be made only by recovery of the causative organism through laboratory procedures.

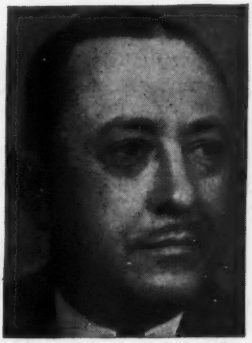
A rapid, whole blood typhoid antigen is being developed, but is still in the experimental stage and is not available for distribution to other than research workers.

Old methods of control of fowl typhoid have proved of little avail when applied to commercial broiler plants. Young and old birds are affected alike; the principal losses coming in the summer season. Kaupp and Dearstyne many years ago found the disease to be a soil infection and spread principally in the feed and water. Carriers exist; the infection being disseminated by nasal discharges. The disease may be communicated through the egg but this is not an important mode of spread.

The B.A.I. have been asked to undertake a research project with the objective of bringing this disease under control in areas where important losses occur and in cooperation with the state of Delaware has such work in progress.

Present Status of Avian Pneumoencephalitis

Dr. Harry W. Schoening, Head Veterinarian in Charge, Pathological Division, Bureau of Animal Industry, USDA, stated that avian pneumoencephalitis is known to exist in 17 states. Serum neutralization tests have indicated its probable presence in 12 additional states and it has been diagnosed clinically in one other state. Comparatively little is known of the distribution within the states in which it is known to occur.



HARRY W. SCHOENING
As head of the Pathological Division of the B.A.I., Doctor Schoening bears the mantle of a succession of outstanding pathologists — his predecessors, D. E. Salmon, Theobald Smith, V. A. Moore, Victor Norgaard, John R. Mohler and Adolph Eichhorn. The tradition of achievement has not suffered in his keeping

Facilities for diagnosis are now available in 26 states and planned for early establishment in five additional states.

The principal demand of the poultry industry, from regulatory officials and from others is for more research. At present, the collection

of statistics, study of means of diagnosis and improvement of the vaccine now available is being considered. Much research is planned, which is not yet under way.

Spread of Avian Pneumoencephalitis (Newcastle Disease)

Dr. Erwin Jungherr, University of Connecticut described the appearance of avian pneumoencephalitis in New England in 1945 and its spread in New England and in the Middle West in the past two years. The story is not a pleasant one. While blame for the spread of the disease was not placed, the handling of the disease in this country contrasts radically with the prompt suppression of it, twice in England, once in Australia and once in Natal.

The following examples of communication of the disease were cited as typical of what has occurred.

A flock of 500 adult fowl was affected and disposed of. Three hundred chicks were housed in the same building later and the disease broke out among them in eight days.

The disease was introduced on a farm where excellent sanitary conditions obtained. Shortly thereafter a flock on a farm one-half a mile away developed the disease.

The disease appeared in what was believed to be a completely isolated flock. Three thousand birds in a nearby flock developed neutralizing bodies in an inapparent spread.

Fowl at a hatchery developed respiratory symptoms which were not recognized as pneumoencephalitis. The disease developed in many but not all batches of baby chicks shipped from this hatchery; the mortality ranging from 13 to 75% in affected shipments.

A shipment of 5000 baby chicks from another hatchery suffered a 47% mortality and the disease spread to older birds on the premises.

Avian Pneumoencephalitis (Newcastle Disease)

Avian pneumoencephalitis as it occurs in Minnesota was the subject of a paper by Dr. R. Fenstermacher of the University of Minnesota. Not all cases of the disease can be diagnosed by the symptoms or lesions. Judging by the literature the lesions are more obvious and more characteristic in most other countries than they are in this country or at least than they are in Minnesota, although some fairly acute outbreaks with high mortality similar to outbreaks in foreign countries, occurred in that state.

Avian pneumoencephalitis was first diagnosed in Minnesota in May, 1946, in poults. In June and July outbreaks occurred in 36 shipments of baby chicks and started pullets from Missouri. These outbreaks occurred in widely disseminated districts.

In turkeys pneumoencephalitis is clinically very similar to air sac disease. However, air sac disease spreads slowly among turkeys and is difficult to transmit artificially. In both respects avian pneumoencephalitis differs from it. The outlook is anything but pleasant for the turkey industry. It is regrettable that the industry and the poultry industry as a whole is so apathetic to the presence, among our flocks, of this first rank avian plague.

Another disease of turkeys that closely resembles avian pneumoencephalitis in its clinical aspects is local Pasteurella infection of the brain. Both air sac disease and local Pasteurella brain infection are well known to turkey raisers and because avian pneumoencephalitis cannot be distinguished clinically from either the possibility remains of outbreaks of the latter being mistaken for one or the other of the less important diseases until widespread infection has occurred. On this account great losses may be sustained.

Hungarian quail are highly susceptible to intramuscular inoculation with avian pneumoencephalitis virus. Chucker quail and pheasants resisted intramuscular injection of the virus.

Attitude of Poultry Industry to Avian Pneumoencephalitis

Dr. Cliff Carpenter discussed the reaction of various groups in the poultry industry to the recommendations of the National Committee on Newcastle Disease and the action of the livestock sanitary authorities in various states based upon those recommendations. The attitude of groups within the industry varies from enthusiastic cooperation with the authorities in their efforts to limit the spread of the disease to attempts at complete obfuscation of the problem and unqualified objection to any control measures affecting themselves.

DR. CLIFF D. CARPENTER

President, Institute of American Poultry Industries, 110 N. Franklin St., Chicago 6, Illinois

A committee of the Farm Bureau Federation has voiced complete agreement with the recommendations of the National Committee.

The grain and feed dealers offer full cooperation. The industry in New England wants indemnity for loss suffered because of quarantines. The broiler industry regards eradication of the disease as impracticable and wants indemnity for birds killed. The International Baby Chick Association holds that (1) the disease cannot be eradicated, (2) there is no cause for alarm concerning it, (3) the disease is not spread by baby chicks and (4) there is need for a vaccine. Modesty compels them to refrain from saying the vaccine should be distributed through hatchery salesmen. The baby chick association further deplores the publicity that has been given to the discovery of this disease in this country.

The turkey growers want a vaccine. The poultry shows and egg laying contest interests are opposed to state regulations interfering with these activities. California poultry growers regard other diseases with which they have to contend as more important than avian pneumoencephalitis. The poultry nutrition council deplores the publicity the disease has received and regards it as unjustifiable. It believes the loss caused by this disease is lower than that of various other diseases and asks that the National Committee on Newcastle disease be disbanded.

Report of Committee on Miscellaneous Transmissible Diseases of Poultry

Among other observations, the chairman of the Committee, Dr. Erwin Jungherr, Connecticut, stated:

The U. S. Livestock Sanitary Association has long been aware of its responsibility to the two billion dollar poultry industry.

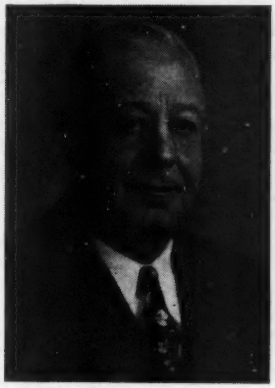
Dr. Erwin Jungherr, Connecticut Agricultural Experiment Station, Storrs, Conn.

The pullorum disease control plan is now operating in 47 states with respect to chickens and in 36 states for turkeys.

The Canadian variant of *S. pullorum* which does not react satisfactorily to the standard antigen poses a new problem which the B.A.I. is studying.

Outbreaks of pullorum disease have been observed in canaries in Kentucky and in pigeons in Connecticut. The infection has been diagnosed also in swine and in calves.

Swine erysipelas in turkeys is increasing in importance in the northeastern and northwestern sections of the country and in Colorado. This disease was seen also in a flock of 2000 ducks.



WILL J. MILLER

President of the U. S. Livestock Sanitary Association for 1947. Mr. Miller, Livestock Commissioner of Kansas, is the first layman to be elected to the presidency of the association in 40 years. All other presidents, since 1906, have been veterinarians except the late M. P. Ravenel, M.D., who was president in 1912

Livestock sanitary authorities are fully aware of the menace of avian pneumoencephalitis to chickens, turkeys and other barnyard and game fowl but too little attention is being given to the dangers to persons associated with infected birds. Many cases of conjunctivitis in flock attendants have been reported from Egypt.

The first national conference on avian pneumoencephalitis was held in Washington, May 2-3, 1946. At that meeting a national committee on Newcastle disease was formed. The committee has held meetings in Chicago, St. Louis and Washington. Many have protested the recommendation of the committee that poultry shows be banned. These protests have in the main come from small groups.

Officials U. S. L. S. A. for 1947

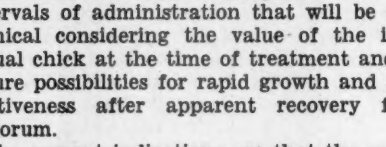
President: Will J. Miller, Topeka, Kansas. First Vice President: Dr. J. V. Knapp, Tallahasse, Fla. Second Vice President: Dr. T. O. Brandenburg, Bismark, N. Dak. Third Vice President: Dr. C. P. Bishop, Harrisburg, Pa. Secretary-Treasurer: Dr. R. A. Hendershott, Trenton, N. J.

Streptomycin in the Treatment of Pullorum in Baby Chicks

By DONALD V. BENSON[1]
Stillwater, Okla.

THERE has been an extensive and thus far rather disappointing search for a dependable treatment for pullorum disease of chicks. The following experiments indicate that streptomycin may be suitable for preventing high mortality due to pullorum in baby chicks. The practical application of the use of this drug will depend upon its future price and the determination of minimal therapeutic doses and intervals of administration that will be economical considering the value of the individual chick at the time of treatment and its future possibilities for rapid growth and productiveness after apparent recovery from pullorum.

The present indications are that the use of streptomycin for the treatment of pullorum in fancy birds of other species (canaries, love



Two-day-old chicks were used in tests

birds, etc.) which have a high cash value is at present economically sound.

Salmonella pullorum strain 280 (California Agricultural Experiment Station) was inoculated intraperitoneally into several baby chicks and was recovered from the bone marrow. One of these reisolated cultures which proved consistently to be virulent was used in these experiments. I have called it 280-9-19 for convenience of my own records, but do not claim it to be a new or different strain.

All injections of streptomycin[2] were given subcutaneously in the lateral posterior abdominal region. The streptomycin was dissolved in sterile saline solution at the rate of 10,000 units per 0.1cc of solution for the first injections of Experiment No. 1 and at the rate of 5,000 units per 0.1cc for all other injections of all experiments.

[1] Research Foundation, Oklahoma Agricultural and Mechanical College.
[2] The streptomycin used in these experiments was kindly furnished by Abbott Laboratories.

Experiment 1:

Forty Black Australorp two-day-old chicks were given a saline suspension of a 24-hour culture of 280-9-19 intraperitoneally. At the same time 100cc of a 24-hour broth culture of 280-9-19 was poured into the watering trough. Twenty-four hours from the time of inoculation, two chicks were dead and two which were unable to raise their heads were killed. The remaining 36 were divided into two groups with an attempt to put an equal number of apparently healthy and sick chicks in each of the groups. The average weight of the chicks at this time was 37 grams. Each chick in group No. 1 was then given 10,000 units of streptomycin, dissolved in 0.1cc of sterile saline. Other treatments are shown in Table I. The chicks were kept together in a small electric brooder, under ordinary sanitary conditions. The water trough was cleaned out 48 hours after the broth culture was added. The times of treatment and death losses are shown in Table I.

TABLE I.—EFFECT OF STREPTOMYCIN ON PULLORUM. EXPERIMENT I

Hours following inoculation	Dosage given treated chicks	Total number of the 18 chicks treated that died	Total number of the 18 untreated chicks that died
24	10,000 Units	0	0
27	5,000 "	0	0
30	5,000 "	1	0
33	2,500 "	2	0
38	2,500 "	2	2
48	2,500 "	2	5
51	2,500 "	2	5
57	———	2	7
72	———	2	13
81	———	3	14
96	———	3	17
144	———	11	18
1 week old	———	12	18
2 weeks old	———	12	18
3 weeks old	———	12	18

It appears that treatment was discontinued too soon, for eight treated chicks died in the 96-144 hour interval. At the age of one week the live treated chicks had an average weight of 56 grams, at the age of two weeks 94 grams, and at the age of three weeks 136 grams.

Experiment 2:

Fifty-two Rhode Island Red chicks, two days old, with an average weight of 36 grams, were

inoculated and fed a broth culture of 280-9-19 as in Experiment 1. Sixteen hours after inoculation they were divided into two equal groups and given subcutaneous injections of streptomycin in a manner similar to that of Experiment 1. The schedule of treatments and death losses are shown in Table II.

TABLE II.—EFFECT OF STREPTOMYCIN ON PULLORUM. EXPERIMENT II

Hours following inoculation	Dosage given treated chicks	Total number of the 26 chicks treated that died	Total number of the 26 untreated chicks that died
16	5,000 Units	0	0
19	2,500 "	0	0
22	2,500 "	0	0
25	2,500 "	0	0
46	2,500 "	0	2
50	2,500 "	0	4
64	2,500 "	1	11
67	2,500 "	1	12
72	2,500 "	1	13
88	———	1	17
91	———	1	17
96	———	1	21
120	———	1	22
1 week old	———	1	23
2 weeks old	———	3	23

These chicks did not respond to 280-9-19 as quickly as expected, so after the first four treatments with streptomycin the treatment was discontinued until two untreated chicks died. The treatments prevented most of the treated chicks from showing any symptoms of pullorum during the entire experiment.

During the second week two of the treated chicks died. One had a slowly developing encephalitis and the death of the other was sudden and appeared to be from accidental injury.

Experiment 3:

Fifty-two White Rock chicks, two days old, with an average weight of 36 grams, were inoculated and fed a broth culture of 280-9-19 as in Experiment 1. Sixteen hours after inoculation one chick was dead and one which could not raise its head was killed. The remaining 50 were divided into three groups, attempting to have an equal number of chicks showing symptoms of pullorum in each group, and treatment was started. These treatments were given at 12-hour intervals in an attempt to get satisfactory results with fewer treatments. The schedule of treatments and death losses are shown in Table III.

At one week of age the three live untreated chicks had an average weight of 45 grams. The 14 live chicks receiving 5,000 units per treatment had an average weight of 52.5 grams. The 14 live chicks receiving 2,500 unit treatments averaged 50.5 grams in weight.

Salmonella pullorum was recovered from the bone marrow of 90% of all the chicks which died. All injections were made in the same region, and no local reaction which could be attributed to streptomycin was observed in the area of injection. On some chicks the skin of this area became slightly dry and hard, which probably was due to too liberal an application of 70% alcohol, used as a disinfectant.

Summary and Conclusions

1. Streptomycin is relatively non-toxic to chicks, 694 units per gram of live weight having been given within a 14-hour period without any marked ill effects.

2. Streptomycin is easy to administer to chicks when they are closely confined; however, repeated treatments are time consuming.

3. Streptomycin is an effective antibiotic against *Salmonella pullorum* in chicks.

4. Practical application of the use of streptomycin for pullorum will depend upon the results of extensive tests using several strains of *Salmonella pullorum* and upon the future cost of this antibiotic agent.

TABLE III.—EFFECT OF STREPTOMYCIN ON PULLORUM. EXPERIMENT III

Hours following inoculation	Dosage given treated chicks	Total number of 17 chicks treated with 5,000 units that died	Total number of 17 chicks treated with 2,500 units that died	Total number of 16 untreated chicks that died
16	5,000 and 2,500 Units	0	0	0
28	5,000 and 2,500 "	0	0	0
40	5,000 and 2,500 "	0	3	1
52	5,000 and 2,500 "	0	3	2
64	5,000 and 2,500 "	1	3	4
76	—— ——	1	3	5
88	—— ——	1	3	11
100	—— ——	1	3	11
112	—— ——	2	3	13
1 week old	—— ——	3	3	13

At one week of age the live, treated chicks had an average weight of 54 grams and at two weeks the average weight was 91 grams. At the age of one week the live untreated chicks had an average weight of 52 grams and at the end of the two weeks their average weight was 71 grams.

Effects of Penicillin on Erysipelothrix Rhusiopathiae and on Mice Infected with that Organism

By CHARLES G. GREY*
Washington, D. C.

THE incidence of *Erysipelothrix rhusiopathiae* infection in the United States has been on the increase over a period of years, until now it is of major importance in both the swine and turkey raising industries. Swine erysipelas antiserum is of some value if administered early in outbreaks of the disease; however, results of its use are far from satisfactory. There is great need for a therapeutic agent that is effective against *E. rhusiopathiae* once it is established in an animal. When, therefore, penicillin was made available for experimental purposes, tests were projected to determine its action on this organism. As a preliminary step we first repeated the work of Drs. Heilman and Herrell, who reported in the Proceedings of the Staff Meetings of the Mayo Clinic, June 28, 1944, on *in vitro* and *in vivo* tests of penicillin salts in respect to their bacteriostatic actions on *E. rhusiopathiae* and also the treatment of mice infected with that organism.

Inhibitory and Germicidal Action on *E. Rhusiopathiae*

Briefly, these investigators found that growth of their three strains of *E. rhusiopathiae*, tested *in vitro* with penicillin calcium, was inhibited in the tubes containing 0.1 of a unit of penicillin per cubic centimeter of material and was partially inhibited in the tubes which contained 0.01 of a unit per cubic centimeter.

We have confirmed their findings, using both the sodium and calcium salts of penicillin, and observed the action of the salts on 34 strains of *E. rhusiopathiae in vitro*. These strains were obtained from the sources indicated in Table I.

TABLE I.—ERYSIPELOTHRIX RHUSIOPATHIAE CULTURES TESTED

Source of Culture	No. of Strains Tested
Hog cholera virus	1
Mink	1
Swine	17
Turkeys	10
Chickens	3
Human	1
Bovine	1

Determination was made of the number of units of penicillin necessary to kill 24-hour broth cultures of *E. rhusiopathiae* (beef infusion broth, pH 7.3). The same 34 strains of *E. rhusiopathiae* were used in this test, the results of which are given in Table II.

TABLE II.—GERMICIDAL ACTION OF PENICILLIN ON ERYSIPELOTHRIX RHUSIOPATHIAE

Source of Culture	Strain	Units of Penicillin Calcium per cc of 24-hr. Broth Culture	Length of Time in Hours Necessary for Germicidal Action
Hog cholera virus	362	100	24
Mink	94644	50	48
		100	24
Turkey	VR-2	100	24
Swine	X-2	100	*
Swine	Cushing	100	24
Chicken	6025-1	100	*
Turkey	M-17	100	24
Turkey	54336	10	24
Swine	R7-R5	100	24
Chicken	6025L4	100	24
Turkey	Vermont	10	24
Swine	M-3	100	48
Turkey	M-15	25	24
Human	Klauder	25	72
		50	72
		100	72
Turkey	44074	25	24
Turkey	53713	10	24
Turkey	VR-1	10	48
		25	48
		50	48
		100	48
Chicken	474	100	*
Turkey	M-16	10	48
		25	48
		50	48
		100	24
Swine	X-1	50	24
Swine	X-3	100	*
Swine	2489	10	72
		25	48
		50	24
Bovine	4981	100	72
Swine	j-80	10	72
		25	24
Swine	T-200.4	25	24
Swine	R-7	25	24
Swine	C-1	10	48
		25	24
Swine	BH-2	10	72
		25	72
		50	24

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Swine	557.1	10	72
		25	72
		50	72
		100	72
Swine	472LF	10	72
		25	24
Swine	R75-S	10	72
		25	48
		50	72
		100	48
Swine	87193	100	24
Swine	87184	100	24
Turkey	7071	50	24

*Failed to kill in 72 hrs.

Apparently there is considerable variation in the germicidal effect of penicillin on the various strains of *E. rhusiopathiae in vitro*. Therapeutic response following administration of penicillin to erysipelas-infected animals would, therefore, depend somewhat on the strain of *E. rhusiopathiae* causing the infection, and its relative resistance to the action of penicillin. However, resistance of an individual strain of *E. rhusiopathiae* to the action of penicillin *in vitro* does not necessarily correlate with virulence of that strain for susceptible turkey poults, as may be seen in Table III.

TABLE III.—RELATION BETWEEN (1) RESISTANCE OF INDIVIDUAL STRAINS OF ERYSIPELOTHRIX RHUSIOPATHIAE (TURKEY ORIGIN) TO ACTION OF PENICILLIN IN VITRO AND (2) VIRULENCE OF THESE STRAINS TO TURKEY POULTS 2 TO 4 WEEKS OF AGE

Strain of *E. rhusiopathiae*	Units of Penicillin per cc of Broth Culture Necessary to Kill in 24 Hours	Mortality of Poults exposed to *E. rhusiopathiae*	
		Number	Percent
M-17	100	12	100
M-15	25	6	50
VR-2	100	7	66—
M-16	100	11	92
Vermont	10	11	92
VR-1	*	11	92
53713	10	8	67
54336	10	6	50
44074	25	10	83

*100 failed to kill.

Therapeutic Action in Mice

Using mice infected with *E. rhusiopathiae*, Doctors Heilman and Herrell administered penicillin subcutaneously at the rate of 1,000 units per day in divided doses. Both the sodium and calcium salts of penicillin were used. The mice received 125 units dissolved in physiologic salt solution at 9:00 a.m., 12:00 noon, 3:00 p.m., and 6:00 p.m., and 500 units of ground penicillin suspended in sesame oil at 9:00 p.m. to last through the night.

Three groups of mice, totaling 40 treated and 40 untreated, were exposed to 0.05cc amounts of *dilutions* of *E. rhusiopathiae* culture subcutaneously. The culture dilutions corresponded to tubes Nos. 3, 4, and 7 of the McFarland scale.

Treatment started immediately following exposure in the first group of 16 mice (8 treated and 8 controls) and continued four days (4,000 units). All treated mice survived and the controls died within two to three days following exposure.

Treatment in the second group of 24 mice (12 treated and 12 controls) was delayed until 21 hours after exposure and continued four days (4,000 units). Two of the treated mice died while the rest survived. All controls died between the second and seventh days following exposure.

Treatment in the third group of 40 mice (20 treated and 20 controls) started 16 hours after exposure and continued seven days (7,000 units). All treated mice survived and the controls died between the fourth and eighth days following exposure.

November 11, 1945, we set up a series of three tests with *E. rhusiopathiae*-infected mice. The first group of mice (15 treated and 15 controls) was exposed to 0.03cc amounts of *undiluted E. rhusiopathiae* culture *subcutaneously* (swine strain M-3, which *in vitro* required 100 units of penicillin per cc of a 24-hour broth culture to kill it in 48 hours). Treatment started within an hour following exposure. Each mouse received 250 units of penicillin dissolved in 0.85% saline at 9:30 a.m., 12:30 p.m., and 3:30 p.m., and 250 units suspended in sterile peanut oil at 5:00 p.m. each day for four days (total 4,000 units). Twelve, or 80%, of the treated mice survived. The untreated mice died between three to five days following exposure.

The second and third groups of mice (15 treated and 15 untreated in each group) were not protected by doses of penicillin (all suspended in oil) smaller than those doses used in the first group.

Summary

The effect of penicillin *in vitro* and *in vivo* on *E. rhusopathiae* has been observed.

The growth of *E. rhusiopathiae* is completely inhibited by 0.1 of a unit of penicillin per cc of material, and is partially inhibited by 0.01 of a unit per cc.

The germicidal effect of penicillin varies with the strain of *E. rhusiopathiae* on test.

Resistance of an individual strain of *E. rhusiopathiae* to the action of penicillin *in vitro* does not correlate with the virulence of that strain.

Penicillin in repeated doses of sufficient concentration is effective in inducing recovery of *E. rhusiopathiae*-infected mice.

DDT in Canine Practice*

By HAMILTON KIRK
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AS a result of the wide publicity given to DDT as an insecticide, the general public (and, indeed, the practitioner) has been given an impression that any ecto-parasite or fly will succumb to its effects, and that the substance is non-toxic for man and animals.

Both of these assumptions are incorrect, and it seems necessary to lose no time in warning small animal practitioners that DDT is toxic except under certain circumstances. It is to be regretted that the general release of DDT has been extended to the laity, as we find that almost every little "general" shop or pet shop is selling the substance indiscriminately, the purchasing public believing that it is harmless. The drug is extremely cumulative,[1] and cats are especially susceptible to its cumulative action.[2]

Apart from any idiosyncrasy, it is well known how domestic cats naturally will lick off anything applied to the coat. Believing in the early reports of the non-toxicity of DDT dust to small animals, the writer applied some to a cat for exterminating fleas. Several days later the cat was brought in suffering from unaccountable symptoms (which included nausea, hyper excitability, tremors, extensor tetany, inability to stand and, apparently, great pain). No suspicion attached to DDT and the diagnosis could not be determined. Death ensued.

Soon afterwards another cat was brought in also suffering from unaccountable symptoms from which it, too, died. Only later was it elicited that the owner had been applying DDT dust. About the same time a colleague requested a second opinion concerning a dog manifesting paraplegia, muscular tremors, hyperaesthesia, etc.; but on this occasion we were informed that the animal had had several DDT baths against ecto-parasites. Appropriate measures were taken and the dog recovered. A second dog was treated for a similar complaint and also recovered.

The drug appears to damage the liver severely and to exert a specific action upon the nervous system with the production of local and generalized muscular tremors, paralysis and sometimes convulsions.

According to Cameron[3] "With large single doses of DDT administered by any route signs of intoxication appear in 12 to 24 hours. The animal feels cold, its fur is ruffled and diarrhea may be present. It appears to be nervous and very sensitive to stimuli. Muscular weakness sets in, especially in the muscles of the back; fine and coarse tremors develop in the back and limbs, and the animal may shake violently for hours on end. Movement is restricted, staggering and spastic. . . . A mild secondary anemia, toxic in type, and pronounced leucocytosis are quite common in animals. Leucocytosis seems to be correlated with clinical features of intoxication and serves as an intimation that the toxic level is being reached."

Anorexia and loss of weight are early in evidence, followed soon by hyperexcitability[4] and extensor rigidity. Death from respiratory failure occurs perhaps within 48 hours, or may be delayed for several days.

DDT is not rapidly lethal. Visible symptoms may be evident for days and even a week before death

Upon autopsy the chief lesions found are fatty degeneration and necrosis of the liver.[5] There may be pulmonary edema and/or fatty degeneration of the kidneys or myocardium. DDT has been found in all tissues examined and in the feces. The highest concentrations are present in the bile and fatty tissue. The urinary excretion of DDT is very slow. It can be demonstrated in the tissues 15 days following a single administration of the drug.

Lactating dogs receiving DDT by mouth have secreted milk containing appreciable levels of the drug.[6]

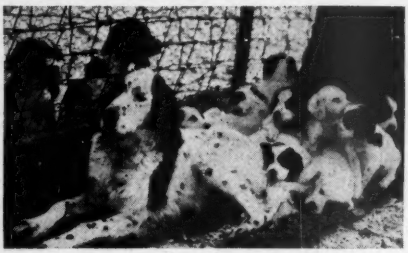
DDT is not rapidly lethal; affected animals which have come under the writer's observation have exhibited visible symptoms for several days up to more than a week before succumbing. Even the insect seems to survive its action for 24 hours or more before eventually dying.[7] The effect on the fly is apparently also on the nervous system. To insects, DDT is both a stomach and a contact poison, but no spectacular or "knock-down" effect is to be expected unless this agent is incorporated in emulsions or solutions with pyrethrins or other agents which exert a rapid action.

One might ask: "Why add DDT if the pyrethrins, etc., have a knock-down effect?" The answer appears to be that such rapid effects are fleeting, whilst those of DDT may endure for weeks or even months on walls or objects which are treated.

Striking success has been achieved against

*Reprinted from *The Veterinary Record*, 58:43, pp. 465-466, 1946.

such diverse pests as house flies, stable flies, cockroaches, lice, bugs, mosquitoes, fleas, moths and locusts.[8] Läuger, the Swiss scientist who discovered the insecticidal properties of DDT, calculated that on glass a deposit of one billionth of a gram per sq. cm. (or 1 oz. per 1,000 square miles) is fatal to house flies.[9] He stated that insects once affected by DDT, no matter how slightly, inevitably die. "One after another so many insects were found susceptible to the action of DDT that this substance was



Lactating dogs receiving DDT by mouth have secreted milk containing the drug

soon on the way to being regarded as a certain cure for every ill attributable to an insect pest. But greater experience and a more restrained and critical approach have somewhat modified the picture."

Nevertheless, we now have an excellent means of ridding our kennels and cookhouses of the pestilential, disease-conveying house fly and blowfly. The choice of vehicle in which DDT is to be incorporated is important in this connection, as will be seen later. DDT is very slightly soluble in water, so that it has to be used as a dust, in oily solution *or as a mist*. In the former case it is mixed with clays, talcs, sulphur, etc., and ground into fine powders containing minute particles of DDT in various strengths.

If a wetting agent be added to such powders they can be mixed with water and used as sprays. Oily solutions employ various petroleum oils, especially kerosene, xylene, and other solvents for dissolving DDT. In this way spray-solutions or emulsions are prepared.

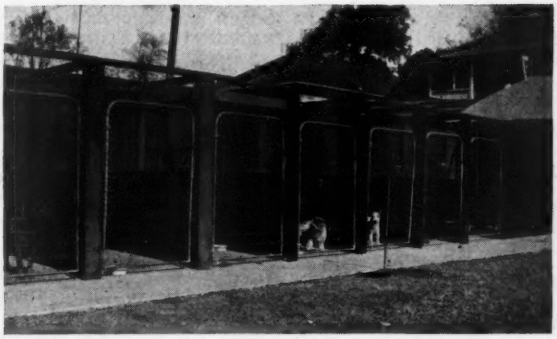
Aerosols and mists make use of sesame oils, cyclo-hexanone, freon and other oily solvents as dispersing media. Absorption into the body is thus dependent on the physical state of DDT during contact with the surface and body cavity tissues. In general it may be said that powdered forms present little risk of absorption, but oily solutions and emulsions can penetrate some of them with ease.[3] Thus, whilst little risk would attach to the treatment of a dog's or cat's coat with DDT dust, or aqueous suspension, from the absorption point of view, precautions would have to be taken against licking.

The powders obtainable from the various manufacturing sources differ in their DDT content. Some contain as much as 10% [in U. S. 50%], others as little as 2%. A happy medium would be about 3% for application to the body. For treating walls, cupboards, clothes, etc., the higher concentration would be employed provided there was no possibility of it being licked or gaining access to food.

The increased toxicity of DDT when in oily solution makes it incumbent upon veterinarians to avoid its application to the body; and even in the spraying of kennel walls or cat cages there should be no excess which could come into contact with the animal body. Kerosene has been used as a solvent for spraying buildings, and of course the oil soon soaks into the wood, or volatilizes, leaving a dry surface. But there may be a slight increase in the risk of fire.

As previously stated, different species of animals vary in their susceptibility, man and dog being apparently fairly resistant, but cats very susceptible. Smith & Stohlman[1] ascertained that the minimum lethal dose for the cat, of DDT in olive oil, administered *per os*, is 300mg (about 5grs) per kg of body weight.

Ten grams of 4 to 5% DDT dust has been found effective in eliminating the dog and cat flea, with protection from reinfestation lasting four to seven days.[10]



In ridding kennels of insect pests the choice of the vehicle for DDT is important

Last summer and autumn brought a dreadful plague of fleas. One greyhound trainer had a flea-infested shed which, over a period of several months, had been scrubbed, sprayed and fumigated with all kinds of substances, yet still remained infested until DDT suspension was used.

Those persons employed in the application

of mists or dusts, etc., must be careful, as the inhalation of finely dispersed DDT particles in the form of mists or aerosols can lead to harmful effects and death; but it seems that fairly high concentrations are necessary, and time of exposure must be long before the danger level is reached.

Cameron & Burgess[11] are of the opinion that sprays containing up to 0.5% could have serious effects only as a result of grossly careless handling. On the other hand, they are insistent that precautions are essential in handling higher concentrations, especially oily solutions.

In the treatment of DDT poisoning, the first procedure is to withdraw the poison by washing it out of the coat or out of the stomach. Unless there is already a severe diarrhea, purgation would be valuable. There appears to be no specific antidote, but sedatives and hypnotics of various kinds (*e.g.*, nembutal) have been recommended.

Kanegis & Roepke[12] state that urethane and dilantin (epanutin) appear to be effective in ameliorating the neurologic symptoms, and that in some cases administration must be continued for two to three days. Calcium gluconate in 10% solution has been reported to relieve the convulsions.[13] Artificial feeding and support for the respiratory and circulatory systems complete all the measures that can usefully be adopted.

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Toxic Effects of DDT on a Cat

A neutered female ginger cat, aged 12 months, and weighing 8 pounds, was washed with one quart of a 0.5% suspension of DDT in water, with a little common soap as lather. After its bath the cat lay in the sun, drying; occasionally it licked its coat. About four hours later the symptoms began. The cat's head was shaken very rapidly by spasms of the neck muscles; the muscles of the back and tail twitched, noticeably the tip of the tail. The hind legs, and to a lesser degree the forelegs, were in tremor. When placed on its feet, the cat had difficulty in walking. At each step the hind leg was jerked-up in full flexion, and vigorously shaken; the action was not unlike that of a horse with stringhalt. Each foreleg was vigorously shaken before the foot was placed on the ground. After about six paces had been taken the gait became almost normal. The cat was able to jump, although she hesitated before taking off. These spasms and tremors recurred whenever the cat attempted to walk after resting. When resting the only abnormal movement observed was a twitching of the ears. She was dull and disinclined to drink, but she ate her food normally. Her temperature was normal and no hyperesthesia was detected. No spasms were induced by light or brisk stimuli.

As there was no perceptible improvement by the second day her coat was thoroughly rinsed with warm water. Immediately the severe symptoms of the first day recurred. The cat was dried in a basket. She lay apparently unable or unwilling to move for about eight hours, after which she improved slightly. However, on attempting to walk, all of the spasms and tremors of the first day recurred in a very severe form.

On the third day there was a general improvement; the spasms were declining in severity and duration. But in the evening, immediately after eating some raw horse meat she had a recurrence of the symptoms as severe as on the first day. Slight symptoms persisted to, and included the fifth day, after which the cat appeared to make an uninterrupted recovery.

Comments: Two of my clients reported that on shampooing their two dogs with a 0.5% suspension of DDT in water, "there was great irritation of the skin," and flare-up of their dermatitis which lasted for about 24-36 hours. I had previously washed, without any detrimental effects, a three-year-old long haired tabby cat with the same preparation and technic used on the cat described in the foregoing. At the time of washing, neither cat showed any sign of dermatitis.—*Helen Neve*, M.R.C.V.S., in *Vet. Rec.*, 58:43. 1946.

Clinical Reports

Cow, General Delivery, Woodinville

The phone rang. Trim Mrs. Conner in nurse's uniform, the wife of my partner, answered the phone. Doctor Schmoker please! Answering the phone I knew immediately that I was dealing with a great emergency. A kid was on the line and all excited. If there is anything that is completely unsatisfactory, it is an emergency and a youngster telling you all about it. The conversation went something like this: "Say Doc come up quick. A heifer had a calf in the woods and she is down—can't get up." "O.K. sonny, what's your name?" "Don't you remember you was up here only a few months ago shootin' some calves." "Well son I have been shooting quite a few calves lately—what's your address, where can I find the heifer?"—"General Delivery, Woodinville," was the answer. My patience began to run short and so I asked: "Is your Dad home?" "Yes." "Well let me talk to him." "You can't." Suspecting that he might be in bed with a broken leg I asked if mother was home. "Yep." "Can I talk to her?" "No." "Why not?" "Well we have no phone at home and I am down here phoning from the store."

Well, after a little shrewd detective work I found out the kid's name. I prepared to make the call. Being of a scientific nature I put two and two together and spelled "milk fever." With that diagnosis and an intravenous outfit and a bottle of calcium gluconate in my grip, I started out to minister to the suffering.

The Plot Deepens

Arriving at the farm, the owner, a middle aged German with his boys were waiting. "Doc, that so and so of a heifer has been locked up for five days and nights because we thought she was going to drop a calf." "Yesterday we figgered she was just foolin' so we let her out. Now what you think she did?" "She dropped a calf and it looks as if all her 'guts' came out," volunteered one of the boys. "SHUT UP," father said. "It ain't guts, because the afterbirth was hanging to it. She must have pushed out watchamacallit? You know, Doc, it's got the same name they give a horse's neck when it's sore." "Oh! I get it, Herman. The heifer pushed out her 'withers'." "That's it, Doc." Turning angrily at the boys he said: "See you dumb kids, you know absolutely nothing and always have your big mouths open."

Feeling as the English must have felt, when Adolph threatened to "goose step" across the Channel—rather unprepared—I tried to make the best of a bad situation. The knowledge that the heifer could not get up and was hiding somewhere in the woods was most discomforting. "I think we should have a block and tackle," says I. The old man roared—"Donnerwetter, Junior, don't stand here. Go and get it." He roared at all five boys to get hot water, towel and soap, a sheet, some chain and ropes.

Darkness Falls Upon Us

In the state of Washington this time of year by 4 P.M. it is about as dark as the inside of a cow's rumen. It was six by now, and in the thick timber, still darker. We had only one flashlight between us and the rays from it looked as anemic as a wormy baby pig lacking iron. *It began to drizzle.* Anxious to get the unpleasant mess over with (envying my "cream puff" colleagues in small animal hospitals) I suggested that we take a look at the heifer. Starting out in the general direction where the heifer was supposed to be, one of the boys stopped me. "Doc," she is slippery and awful steep this way. You sure as Hell gonna break your neck. So after a brief huddle we decided to drive down to Buster Brown's farm, cross the railroad track and work up from the other side of the hill.

The Bliss of a Happy Partnership

You can say all you please about the disadvantages and hazards of partnerships, with quarrelings, jealousies, dishonesty, and incompatabilities spoiling the unholy union. But if anyone was ever happy to have a good partner, it was I just then. I told Herman, that before "mountain goating" up that steep hill I would call my partner, Dr. Roy Conner, and ask him to give us a hand. Calling over the phone I never heard quite such a pleasant voice as when Doctor Conner with heart warming assurance told me, he would be on hand right away.

First Platoon—March

Incidentally the Second Platoon of three boys with warm water, soap and block and tackle descended from the top of the hill toward the heifer. First Platoon, Herman, another of his boys and myself crossed the railroad track and wading through a gully filled with icy water made an amphibious landing at a barbed wire fence. Surmounting this obstacle, going was now easier for the next few yards. Soon, however, we came to a barbed wire entanglement the railroad Co. built after running over a cow and paying for it.

This fence had been put up not only to keep out cattle, but also to keep out cattle physicians, farmers and dogs. It was with the greatest of difficulty that we surmounted this obstacle. From then on it was easy going; only stumps to trip on, fallen logs, conveniently placed, to skin shins and little surface springs everywhere were just minor inconveniences.

Patient Located in Gully

The heifer was sprawled out in a semi-conscious condition. The uterus covered with the still attached placenta was completely everted resting on a bed of muddy soil covered with sharp little twigs and dead leaves. Looking at that prolapsed uterus from behind, with the heifer sloping down the gully, gave me a peculiar perspective—all uterus and *not enough heifer to put it into.* As I detached the membranes I observed that they had preserved the uterus in a rather moist and none too irritated condition. Appreciating every small favor I also observed, with a sense of relief, that the heifer was sufficiently under the influence of parturient paresis to be unable to do much straining.

Welcome Assistance Arrives

Just as I completed the removal of the placenta, Doctor Conner, guided by the fifth of Herman's boy scouts, arrived on the scene. Both were loaded like pack mules and I am sure I saw where some shreds were missing here and there from the trousers of my agile partner, as a result of struggling through the barbed wire entnglements. "Junior" (as I call my partner affectionately) was going to show "Senior" just how an everted uterus is handled. Appreciating his "enthusiasm of youth," we proceeded. Asking the farmer for some sugar to sprinkle on the uterus to let osmosis remove some of the excess serum, he looked at us dumfoundedly. "Sugar iss rationed," he hissed." Cows are not." We continued without sugar.

Modus Operandi

Removing some of the sharpest snags and dead leaves, Doctor Conner stripped and sprawled himself comfortably on the soggy ground. Together we proceeded to replace the uterus. It was a most disheartening job but finally the almost impossible task was accomplished just as the flashlight was about to give up its ghost. Much of the difficulty was due to the gravid horn being completely everted and having dragged the other horn and the bladder out with it.

Scientific Observation in the Field

After replacement of the uterus was completed, Doctor Conner kept his arm in the organ to prevent a relapse while I proceeded to inject 500cc of a warm calcium gluconate solution into the jugular vein. Without my knowledge, research conscious "Junior" placed his hand against the posterior aorta through the uterine wall. He observed that the pulse at the beginning was very quick and shallow. As the calcium gluconate trickled into the vein the pulse began to slow up and the quality improved. Shortly afterwards an irregularity developed. The pulse again became weak and the heart stopped. Doctor Conner thought he had a ring side seat, observing the collapse and death of the patient, but, at that crucial moment, the heart beat was reëstablished and the pulse registered slow and forceful beats.

Everybody worked but Herman, who furnished the restraint and the dog that watched. We finished both operations, but hadn't time to collect our instruments before the flashlight expired

With a little persuading the heifer got upon her feet. We placed a few retaining sutures into the vulvar region and instructed the owner to get the heifer into barn, by zigzagging her slowly up the steep hill.

Back at the Office

After the mess was over we felt very righteous or as "Junior" would call it; we felt like a christmas tree inside. A difficult job was well done and the hardships were soon forgotten.

In the office we surveyed our soiled clothes and began to wash our hands and arms preparatory to a hot tub bath.

Optical Illusion

"Junior's" face was all covered with blood, where he hugged the ground with his left cheek. My face happened to be clean. Seeing his face I rushed to the faucet and washed mine. Doctor Conner, on the other hand, having seen my face, thought that his own must be clean and didn't wash his face. I let him walk into the house and come *tête-a-tête* with Mrs. Conner. She quickly corrected his mistaken diagnosis and had him look in a mirror.

Finally pouring us a little restorative we settled down to discuss the case.

Unique Method of Replacing Everted Uterus

I began the conversation by asking Roy (Doctor Conner) if we had failed to get the enlarged uterus back by what other method could we have accomplished the result? His eyes brightened, as if he were drawing on a vast reserve, and suggested the following:

Take an old bed sheet and tear it into several ribbons about one foot wide. Starting at the posterior extremity of the prolapsed uterus wrap the sheet slowly around the organ, using sufficient tension to force the edematous fluids forward. Now place the second strip over part of the first and work forward, repeating the process, until the entire uterus appears like a long mammoth sausage. With an assistant holding the "sausage" in an elevated position the strip applied last is now removed "feeding" the uncovered portion of the uterus into the vagina as the strips are unwound. Continue this manipulation until the entire organ is replaced.

Two follow-up calls on the heifer showed her to be making an uneventful recovery. Our next ambition will be to get her bred early and in due time to drop a pair of twins.

E. A. SCHMOKER

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"Junior" explains how to handle the hard ones. It sounds all right by a cozy fireside

Complicated Eclampsia

A fox terrier, age three years, with a litter of puppies about six weeks of age was brought to our clinic displaying a typical eclampsia syndrome, with tonic-clonic spasms of the muscles, rapid respiration, accelerated pulse, excessive salivation and subnormal temperature. Our first treatment was 5cc of calcium gluconate intraperitoneally. (We did not use the intravenous route since the animal had just come from another man's hospital, where, the owner informed me, some medicine had been given via this method. So, to avoid a possible heart block from a blood calcium level that would be too high, we chose a slower means of absorption.) In approximately 10 minutes the bitch seemed to be making fairly rapid progress so we dispensed with further treatment.

The following day we received another call from the owner informing us that the dog's condition seemed to be even worse than the night before when we saw her for the first time. We were also informed that since the dog had the puppies she had not "acted right" in that her appetite was poor and she seemed to be "falling away." The dog no longer showed the nervous muscular spasms, but was extremely toxic, complete anorexia, congested mucous membranes and a temperature of 105° F. Upon palpation of the abdomen the pterus felt enlarged and from the pressure of palpation a scant amount of thick, pinkish exudate, mucoid in nature, was emitted from the vagina.

A diagnosis of endometritis was made and treatment was as follows: 50,000 units of penicillin in a peanut oil base intramuscularly every eight hours. An initial injection of 5mg of stilbestrol and daily injections of a high potency vitamin B complex preparation. After 200,000 units of pencillin had been administered the temperature was 101.5° F., appetite good and the animal seemed normal in every sense of the word.

PAUL FRIEDMAN

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Abstracts

Luxation of the Patella, So-called, in Large Animals

The thesis for which the author was awarded the Cadiot Prize* of the French academy of veterinary medicine for 1946 describes a number of common but obscure surgical conditions met in the pursuit of clinical work, among them, "Locking of the patella of horses and cattle" which, in certain English texts, has been erroneously called a luxation. Of this the author writes:

Locking of the patella is frequent in the ox and the horse. According to Cadiot, it is an upward luxation within the trochlea of thin horses, the patella being held in the trochlea by the tension of the internal straight ligament. To Sandrail, the misplacement was due to asthenia of the crural triceps which cannot hold the patella in the trochlea but lets it slip to the face of the femur where it remains locked. The author does not admit Sandrail's pathogenesis because no such displacement of the patella ever occurs in the total crural paralysis of azoturia (myoglobinuria) and, contrary to Cadiot, animals in good condition are not exempt. It generally strikes animals two to five years of age, which have been subjected to hard work and show systemic evidence thereof. In all cases, one can observe a violent contraction of the muscles of the affected leg, especially pronounced in the region of the stifle. In chronic cases, particularly in the ox, the tibio-patellar ligament is slightly hypertrophied and an osteoperiostitis is often developed.

The cause of the accident would then be a femoro-tibial strain, a distension of the internal straight ligament and subsequent violent spasm in the region of the articulation with increased tension upon the ligament.

The treatment recommended is rocking the patient's body to and fro with one hand on the hip while the other pushes upon and manipulates the patella, a method commonly practiced in this country. In stubborn cases, the affected leg is also drawn forward with a sideline. Some have reported success from taking the horse into the open and cracking a whip to excite a sudden lunge.

Comment by Dr. L. A. Merillat.—We have always ascribed this trouble to a lesionless cramp of the musculature surrounding the stifle due to tiring work. I do not recall recurrence as a factor, at least, none is of record in our mental statistics. The mechanism is easily explained. The spastic vasti groups and or the tensor of the fascia lata draw the patella upward and strong biceps femoris pulls it to one side, partly riding, as it were, the lateral lip of the femoral trochlea. When the spasm is suddenly relieved by manipulation, the patella drops into place with a perceptible thud, which has given the trouble the pseudonym of "luxation of the patella." We always preferred "stifle cramp" as the designation. One should also point out that stifle cramp is in no way related to true traumatic luxation which is very rare, nor to chronic luxation (flapping) of the patella due to relaxation of its binding ligaments occurring in congenitally unfortunate youngsters. We frequently severed the internal straight ligament for the latter with a fair measure of success but never saw any cases of stifle cramp that required further treatment than relieving the cramp.

*Priouzeau, M. En glatant dans la pathologie medico-chirurgicale (equine et bovine). *Bulletin de l'Académie Vétérinaire de France*, 19:7, pp. 216-225. 1946.

Antimony Effect on Canine Heart

Antimony has been shown[1] to have no immediate effect upon the electrocardiogram of the dog but does cause weakening of the heartbeat with cardiac dilation. In more prolonged toxicity experiments in dogs, this drug has been shown to accumulate chemically much less in the heart than in the lungs, liver and kidneys. Likewise, pathologic changes in the liver and kidneys preceded heart involvement in the dog. Severe symptoms of hepatic and renal damage were evident at a time when the contrastingly mild heart damage was not clinically evident.—*H. J. M.*

Vitamin A Requirements in Calves

Lewis and Wilson of the Walker Gordon Laboratories determined[55] the minimum daily vitamin A requirement of calves to be 32 units per kilogram body weight (1450 I.U. per 100 lb.). Supplied at this level no symptoms of vitamin A deficiency developed and the calves grew fairly well. For optimum growth double this amount of vitamin A was required, but there was no storage of vitamin A in the liver. It required 256 units per kilogram weight to permit moderate storage and 512 units to effect maximum concentration of vitamin A in the blood plasma.

These authors regard it desirable as a practical measure in raising calves that they receive sufficient vitamin A (10,000 units 100 pounds body weight) in ration to permit moderate storage.

[1] Beaser and Rodryguez-Molina: Electrocardiographic changes occuring during treatment with fuadin solution. *Am. Heart J.*, Nov., 1946.

[55] Lewis, J. M., and Wilson, Logan T. Vitamin A requirement in calves. *Certified Milk*, 21:245, pp. 8-15. 1946.